Appendix A

Site Photographs

NEPA Environmental Assessment
Jefferson Labs Campus Development Project
Jefferson, Arkansas
(Photos taken September-November 2018)

Photo 1: Entrance to the Jefferson Labs property off of NCTR Road.

Photo 2: Facility overview.

Photo 3: Campus entrance.

Photo 4: Daniel Road along the northern perimeter of the Campus.

NEPA Environmental Assessment
Jefferson Labs Campus Development Project
Jefferson, Arkansas
(Photos taken September-November 2018)

Photo 5: Building 13.

Photo 6: Location of the proposed SCF Data Center on the northern portion of the Campus.

Photo 7: Building 11 (water treatment building).

Photo 8: Water processing chemicals in Building 11.

NEPA Environmental Assessment
Jefferson Labs Campus Development Project
Jefferson, Arkansas
(Photos taken September-November 2018)

Photo 9: Water clarifier on the northwestern portion of the Campus.

Photo 10: 1,000,000-gallon ASTs (out of service), oil/water separators and water towers on northwestern portion of campus

Photo 11: 28,000-gallon ASTs and piping currently in use for generator fuel oil backup.

Photo 12: Building 07 (boiler house).

Photo 13: Boilers in Building 07.

Photo 14: Building 14 (under construction).

Photo 15: Building 06.

Photo 16: Building 26.

NEPA Environmental Assessment
Jefferson Labs Campus Development Project
Jefferson, Arkansas
(Photos taken September-November 2018)

Photo 17: Building 26 waste collection area.

Photo 18: Laboratory in Building 51.

Photo 19: Building 05 (south side).

Photo 20: Processing equipment in Building 05A.

Photo 21: Solvent container area in Building 05B.

Photo 22: Building 12.

Photo 23: Building 20.

Photo 24: Out of use chiller equipment in Building 20.

Photo 25: Building 17.

Photo 26: Floor drain in Building 17 (possibly associated with an oil/water separator).

Photo 27: Concrete pad and lid (possibly indicative of a UST) south of Building 17.

Photo 28: Building 16.

NEPA Environmental Assessment
Jefferson Labs Campus Development Project
Jefferson, Arkansas
(Photos taken September-November 2018)

Photo 29: Building 53.

Photo 30: PCB-containing transformer in Building 53A chiller plant.

Photo 31: Emergency generators south of Building 53.

Photo 32: Building 46 and two ASTs.

Photo 33: Building 46 incinerator (out of service) and bedding waste collection equipment.

Photo 34: Building 62.

Photo 35: Building 50.

Photo 36: Hazardous materials lab in Building 50.

Photo 37: Interior of Building 52.

Photo 38: Building 85A.

Photo 39: Building 37.

Photo 40: Alcohol and waste drums in Building 37.

NEPA Environmental Assessment
Jefferson Labs Campus Development Project
Jefferson, Arkansas
(Photos taken September-November 2018)

Photo 41: Hazardous waste storage in Building 37.

Photo 42: Transformer substation on southern portion of the Campus.

Photo 43: Former wastewater treatment tanks (no longer in operation) in Building 44.

Photo 44: Empty methanol tanks west of Building 44.

Photo 45: Building 45 (former EPA Incineration Research Facility).

Photo 46: Diesel AST and sheds east of Building 45.

Photo 47: Water well on the northeastern portion of the Campus.

Photo 48: Well house and equipment on the north side of the Campus.

Appendix B

Wetland Delineation Report

November 12, 2018

United States Army Corps of Engineers
Little Rock District
Regulatory Division
700 West Capitol, Room 7530
Little Rock, Arkansas 72201

RE: Jefferson Labs Wetland and Stream Delineation

The National Center for Toxicological Research (NCTR) located at 3900 NCTR Road in Jefferson Arkansas is in the process of expanding their campus. An environmental assessment is required by the National Environmental Policy Act (NEPA) which includes a wetland and stream delineation for jurisdictional waters. PMI conducted a wetland and stream delineation at the NCTR campus on November 7, 2018 which is detailed in this report.

Summary of Jurisdictional Findings

PMI conducted a preliminary wetland and stream delineation regarding the presence of jurisdictional wetlands and waters of the United States. The proposed property was investigated for the presence of hydrophytic vegetation, hydric soils, and wetland hydrology as the three parameters required by the USACE wetland determination data form. This report summarizes the jurisdictional findings from a site visit on November 7, 2018. Site Maps are attached as Appendix A, site photographs are attached as Appendix B, and data forms are attached as Appendix C.

Linear Drainage Ditches

The NCTR campus has a network of linear drainage ditches for stormwater runoff control. These ditches are maintained, mowed, and contain erosion control check dams. Minor sections of these linear drainage ditches have concrete channels, some of which contain grated covers. Vegetation within these areas contains bermuda grass (*Cynodon dactylon*, FACU) and Saint Augustine grass (*Stenotaphrum secundatum*, FAC). Soils are mapped as Savannah fine sandy

loam, 3 to 8 percent slopes and are classified as hydric. Soil samples from the site visit revealed sandy clay loam with a matrix of 10 YR 5/3 and redox features of 10 YR 6/6. Wetland hydrology indicators present consisted of surface water, saturation, and crayfish burrows.

Ephemeral Stream A

Ephemeral Stream A is located in the northeast quadrant of the site and is depicted in sheet number 1. A network of linear drainage ditches flow into this stream to create minor sinuosity with bed and bank features. A moderate riffle, run, pool system and the presence of minnows were noted at the time of the site visit. Ephemeral Stream A flows into an unnamed tributary to Eastwood Bayou, thence to Eastwood Bayou and thence to the Arkansas River.

Ephemeral Stream B

Ephemeral Stream B is located in the southwest quadrant of the site and is depicted in sheet number 1. A network of linear drainage ditches flow into this stream to create minor sinuosity with bed and bank features. A moderate riffle, run, pool system was noted at the time of the site visit. Ephemeral Stream B flows into Phillips Creek and thence to the Arkansas River.

Wetland A

Wetland A is located in the center of the site and is depicted in sheet number 1. This wetland is approximately 95 square feet. Vegetation within this area contains Southern cat-tail (*Typha latifolia*, OBL). Soils are mapped as Savannah fine sandy loam, 3 to 8 percent slopes and are classified as hydric. Soil samples from the site visit revealed sandy clay loam with a matrix of 10 YR 5/2 and redox features of 10 YR 6/6. Wetland hydrology indicators present consisted of surface water and saturation.

Summary

This wetland and stream delineation for jurisdictional waters was performed as a part of the environmental assessment required by NEPA for NCTR campus expansion. PMI recommends contacting the Little Rock District of the United States Army Corps of Engineers (USACE) if any wetlands, streams, or linear drainage ditches are modified. A USACE 404 Permit may be required depending on the proposed campus expansion. If any more information is required, please do not hesitate to contact John Metrailer at 501-221-7122.

Sincerely,
PMI

John Metrailer, P.E.
Senior Engineer

Appendix A
Site Maps

LINEAR DRAINAGE DITCH

EPHEMERAL STREAM

JURISDICTIONAL WETLAND

DIRECTION OF FLOW

APPROXIMATE STUDY AREA

EPHEMERAL STREAM A

DATA POINT 1

WETLAND A DATA POINT 2

EPHEMERAL STREAM B

SCALE: 0 100' 200'

ISSUED FOR REVIEW

SUBMITTED FOR REVIEW

SHEET TITLE: AERIAL WITH JURISDICTIONAL WATERS

PROJECT TITLE: NEPA ENVIRONMENTAL ASSESSMENT
JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT
JEFFERSON, ARKANSAS

REVISIONS:

NO:	DATE:	DESCRIPTION:	BY:

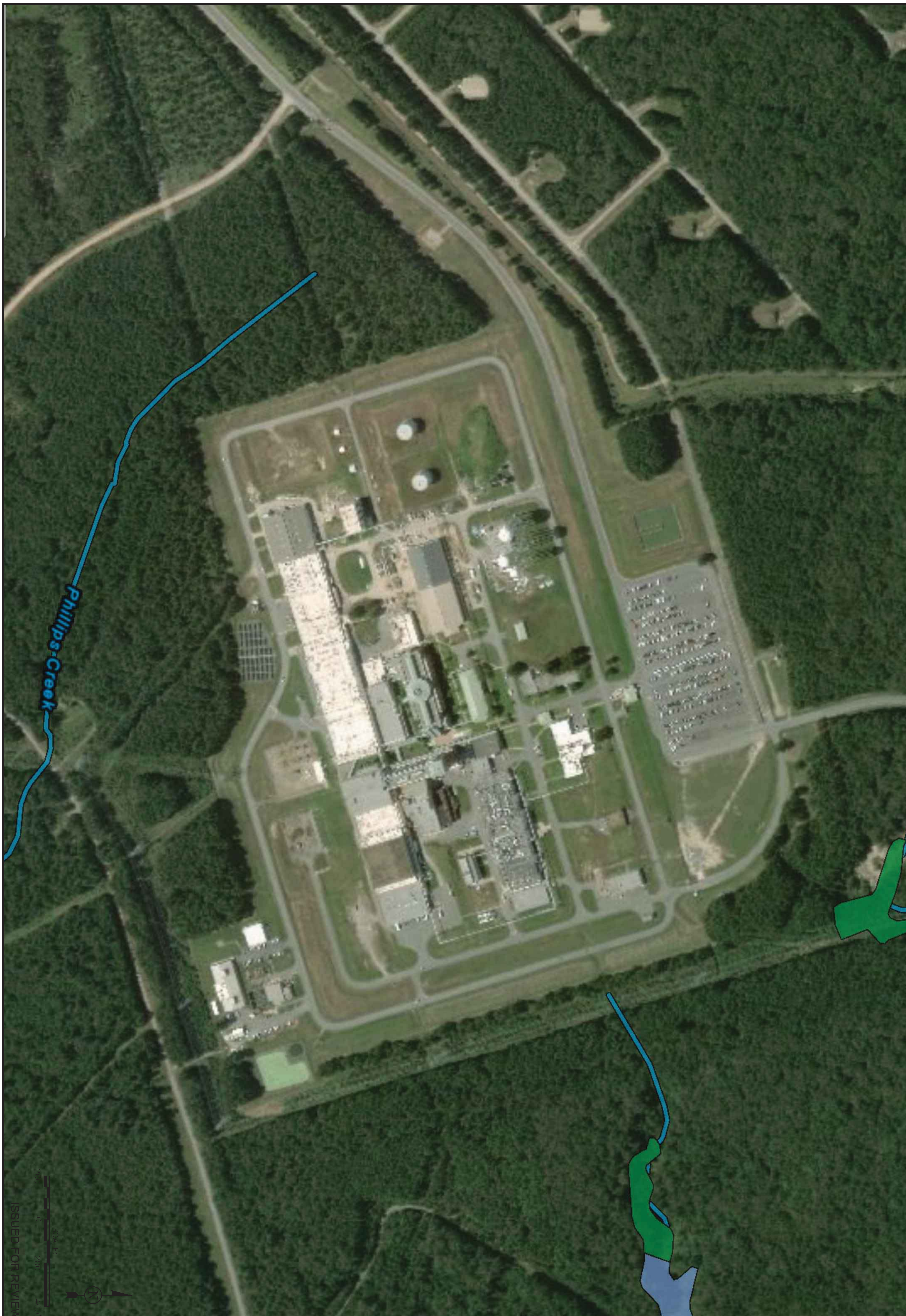
CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH: (501) 221-7122 FX: (501) 221-7775

DESIGNED BY: JTM
DRAWN BY: JTM
CHECKED BY: JTM
DATE: NOV. 12, 2018
SCALE: 1" = 100'

JOB NUMBER: WERA-11258

SHEET NUMBER: 1

P:\E: MI\WERA ARCHITECTS-PLANNERS\WERA-11258 - NEPA ENVIRONMENTAL ASSESSMENT\USACE - STREAM & WETLAND\DRAWINGS\WERA-11258_USACE_DELINEATION.DWG



CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH: (501) 221-7122 FX: (501) 221-7775

REVISIONS:			
NO:	DATE:	DESCRIPTION:	BY:

DESIGNED BY: JTM
DRAWN BY: JTM
CHECKED BY: JTM
DATE: NOV. 12, 2018
SCALE: 1" = 200'

FILE: M:\WER ARCHITECTS-PLANNERS\WERA-11258 - NEPA ENVIRONMENTAL ASSESSMENT\USACE - STREAM & WETLANDS\DRAWINGS\WERA-11258 USACE DELINEATION.DWG

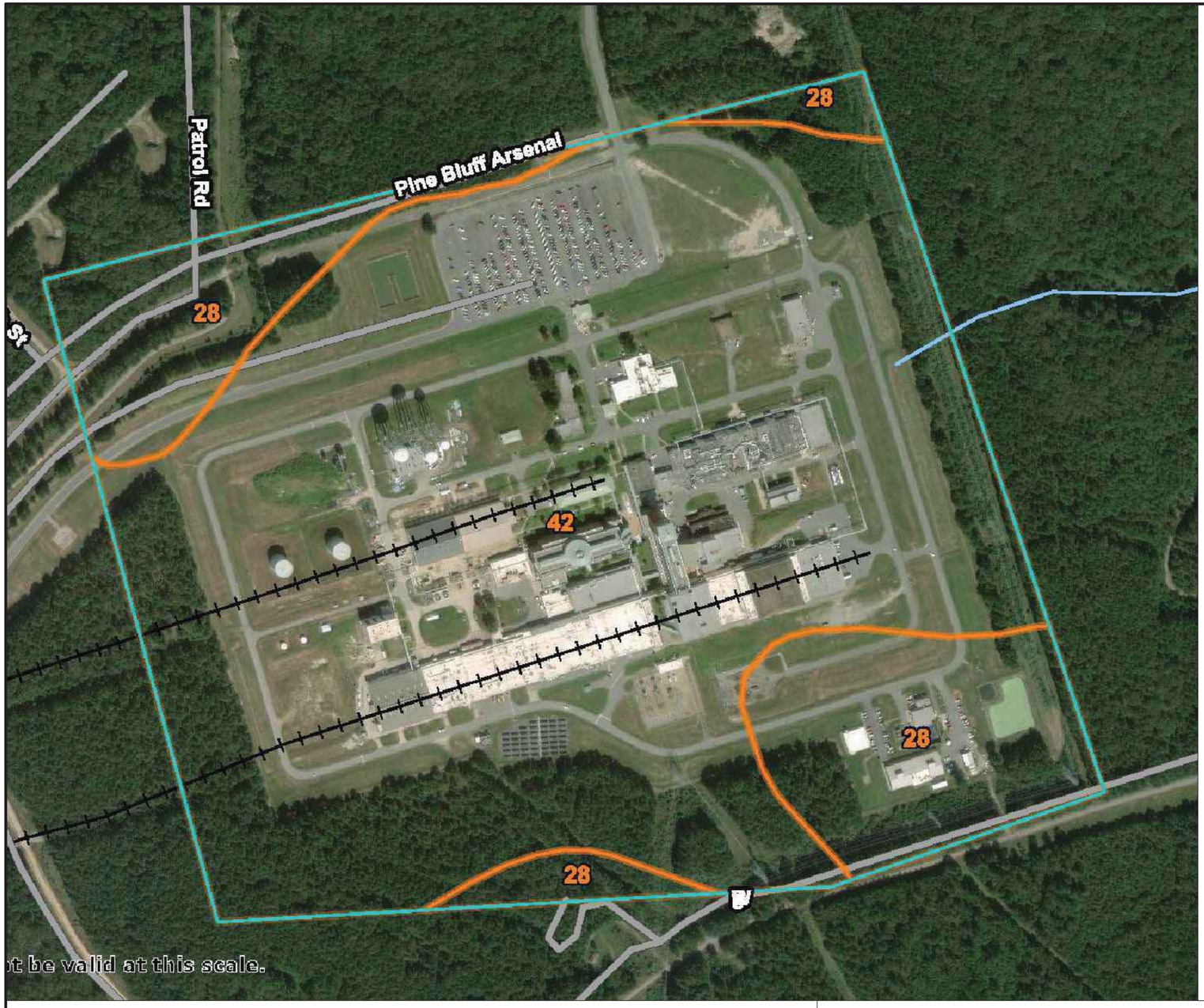
SHEET TITLE: USFWS NATIONAL WETLAND INVENTORY

PROJECT TITLE: NEPA ENVIRONMENTAL ASSESSMENT
JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT
JEFFERSON, ARKANSAS

SUBMITTED FOR REVIEW

JOB NUMBER: WERA-11258

SHEET NUMBER: 2



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 Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
28	Pheba silt loam, 0 to 2 percent slopes	33.1	19.9%
42	Savannah fine sandy loam, 3 to 8 percent slopes	133.1	80.1%
Totals for Area of Interest		**166.2**	**100.0%**

N

SCALE:
200' 0 200' 400'

ISSUED FOR REVIEW

SUBMITTED FOR REVIEW

SHEET TITLE: NRCS SOILS MAP

PROJECT TITLE: NEPA ENVIRONMENTAL ASSESSMENT
JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT
JEFFERSON, ARKANSAS

REVISIONS:

NO.	DATE:	DESCRIPTION:	BY:

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
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PMI

DESIGNED BY: JTM
DRAWN BY: JTM
CHECKED BY: JTM
DATE: NOV. 12, 2018
SCALE: 1" = 200'

FILE: M:\WER ARCHITECTS-PLANNERS\WERA-11258 - NEPA ENVIRONMENTAL ASSESSMENT\USACE - STREAM & WETLAND\DRAWINGS\WERA-11258_USACE_DELINEATION.DWG

JOB NUMBER: WERA-11258

SHEET NUMBER: 3

Appendix B
Site Photographs

PHOTOGRAPH 1 — VIEW EAST OF LINEAR DRAINAGE DITCH. APPROXIMATELY 1” OF RAIN OVER THE THREE DAYS PRIOR TO THE SITE VISIT.

PHOTOGRAPH 2 — VIEW SOUTH OF LINEAR DRAINAGE DITCH PIPED UNDERNEATH EXISTING BUILDING. APPROXIMATELY 1” OF RAIN OVER THE THREE DAYS PRIOR TO THE SITE VISIT.

PHOTOGRAPH 3 — VIEW EAST OF LINEAR DRAINAGE DITCH. APPROXIMATELY 1” OF RAIN OVER THE THREE DAYS PRIOR TO THE SITE VISIT.

PHOTOGRAPH 4 — VIEW EAST OF LINEAR DRAINAGE DITCH. APPROXIMATELY 1” OF RAIN OVER THE THREE DAYS PRIOR TO THE SITE VISIT..

PHOTOGRAPH 5 — VIEW WEST OF LINEAR DRAINAGE DITCH. APPROXIMATELY 1” OF RAIN OVER THE THREE DAYS PRIOR TO THE SITE VISIT.

PHOTOGRAPH 6 — VIEW SOUTHWEST OF WETLAND A. NOTE AREA OF INUNDATION WITH SOUTHERN CAT-TAILS.

PHOTOGRAPH 7 — VIEW SOUTH WHERE LINEAR DRAINAGE DITCH TRASITIONS TO EPHEMERAL STREAM A. APPROXIMATELY 1” OF RAIN OVER THE THREE DAYS PRIOR TO THE SITE VISIT.

PHOTOGRAPH 8 — VIEW EAST OF EPHEMERAL STREAM A WHERE IT FLOWS OFFSITE. NOTE SINUOSITY AND MODERATE RIFFLE, RUN, POOL SEQUENCE.

PHOTOGRAPH 9 — VIEW WEST OF EPHEMERAL STREAM B. APPROXIMATELY 1” OF RAIN OVER THE THREE DAYS PRIOR TO THE SITE VISIT.

PHOTOGRAPH 10 — VIEW SOUTH OF EPHEMERAL STREAM B WHERE IT FLOWS OFFSITE. NOTE SINUOSITY AND MODERATE RIFFLE, RUN, POOL SEQUENCE.

Appendix C
Data Forms

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: NCTR Campus City/County: Jefferson / Jefferson Sampling Date: 11/7/2018

Applicant/Owner: National Center for Toxicological Research State: AR Sampling Point: DP1

Investigator(s): John Metrailer Section, Township, Range: S17 T4S R10W

Landform (hillslope, terrace, etc.): linear drainage ditch Local relief (concave, convex, none): concave Slope (%): 1-3

Subregion (LRR or MLRA): LRR O Lat: 34°21'56.87"N Long: 92° 6'57.35"W Datum: GoogleEarth

Soil Map Unit Name: Savannah fine sandy loam, 3 to 8 percent slopes NWI classification: hydric

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

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

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

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

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes x	No _____	Depth (inches): 2"	
Water Table Present?	Yes x	No _____	Depth (inches): 0"	
Saturation Present? (includes capillary fringe)	Yes x	No _____	Depth (inches): 0"	**Wetland Hydrology Present?** Yes x No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

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

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

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

Herb Stratum (Plot size: 10' x 100')			
1. cynodon dactylon	60		FACU
2. stenotaphrum secundatum	40		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover			

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

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			

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

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	40	x 3 =	120
FACU species	60	x 4 =	240
UPL species		x 5 =	
Column Totals:	100 (A)		360 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

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

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/2	100					loam	
>2	10 YR 5/3	90	10 YR 6/6	10	D	M	sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: NCTR Campus City/County: Jefferson / Jefferson Sampling Date: 11/7/2018

Applicant/Owner: National Center for Toxicological Research State: AR Sampling Point: DP2

Investigator(s): John Metrailer Section, Township, Range: S17 T4S R10W

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1-3

Subregion (LRR or MLRA): LRR O Lat: 34°21'59.16"N Long: 92° 6'36.87"W Datum: GoogleEarth

Soil Map Unit Name: Savannah fine sandy loam, 3 to 8 percent slopes NWI classification: hydric

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

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

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

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

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 2"
Water Table Present?	Yes X	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes X No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

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

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

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

Herb Stratum (Plot size: 10' x 10')			
1. Typha latifolia	60		OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover			

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

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			

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

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	60 (A)		60 (B)

Prevalence Index = B/A = 1

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

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

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP2

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/2	100					loam	
>2	10 YR 5/2	90	10 YR 6/6	10	D	M	sandy clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

Appendix C

U.S. Army Corps of Engineers
Approved Jurisdictional Determination

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203-0867
www.swl.usace.army.mil

June 21, 2019

Regulatory Division

FILE No. **SWL 2019-00204**

Mr. John Metrailer
Pollution Management, Inc.
3512 South Shackleford Road
Little Rock, Arkansas 72205

Dear Mr. Metrailer:

Please refer to your request on June 11, 2019, on behalf of the National Center for Toxicological Research (NCTR), concerning U.S. Army Corps of Engineers permit requirements pursuant to Section 404 of the Clean Water Act (33 U.S. Code 1344). You requested authorization for the placement of dredged and fill material in waters of the United States associated with construction of a Data Center at the NCTR center on the Pine Bluff Arsenal. Approximately 135 linear feet of culverts will be installed for road crossings for this project. The proposed project is located in section 17, T. 4 S., R. 10 W., Jefferson County, Arkansas.

A site evaluation on June 21, 2019, utilizing United States Geological Survey Quadrangle Maps, aerial photography, National Hydrography Dataset, and the Natural Resources Conservation Service Jefferson County Soil Survey, and the supplied wetland determination data forms, by Corps personnel indicates that this area does not meet the definition of wetlands and waters of the United States, as determined by the 1987 Corps of Engineers Wetlands Delineation Manual, Regional Supplements, appropriate guidance, and Department of the Army regulations. Therefore, a Section 404 Department of the Army permit is not required.

This letter contains an Approved Jurisdictional Determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 Code of Federal Regulations (CFR) Part 331. Enclosed you will find a Notification of Appeals Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the Southwestern Division Office at the following address:

Mr. Elliott Carman
Administrative Appeals Review Officer (CESWD-PD-O)
U.S. Army Corps of Engineers
1100 Commerce Street, Suite 831
Dallas, Texas 75242-1317

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by August 19, 2019.

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

This approved jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision of the determination before the expiration date.

This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

Please be advised that the discharge of dredged or fill material in waters of the United States, including wetlands, requires a Department of the Army permit prior to beginning work in most situations. A permit is required pursuant to Section 404 of the Clean Water Act and Corps of Engineers implementing regulations, 33 CFR 320 - 332. The clearing of wetlands with mechanized equipment; landleveling; construction of ditches, dikes, and dams; placement of fill to raise the elevation of a site; and stabilization of banks are examples of activities that routinely require a permit. All of these activities involve the discharge of dredged or fill material in waters of the United States.

Your cooperation in the Regulatory Program is appreciated. If you have any questions, please contact me at (501) 340-1372 and refer to Permit No. **SWL 2019-00204**.

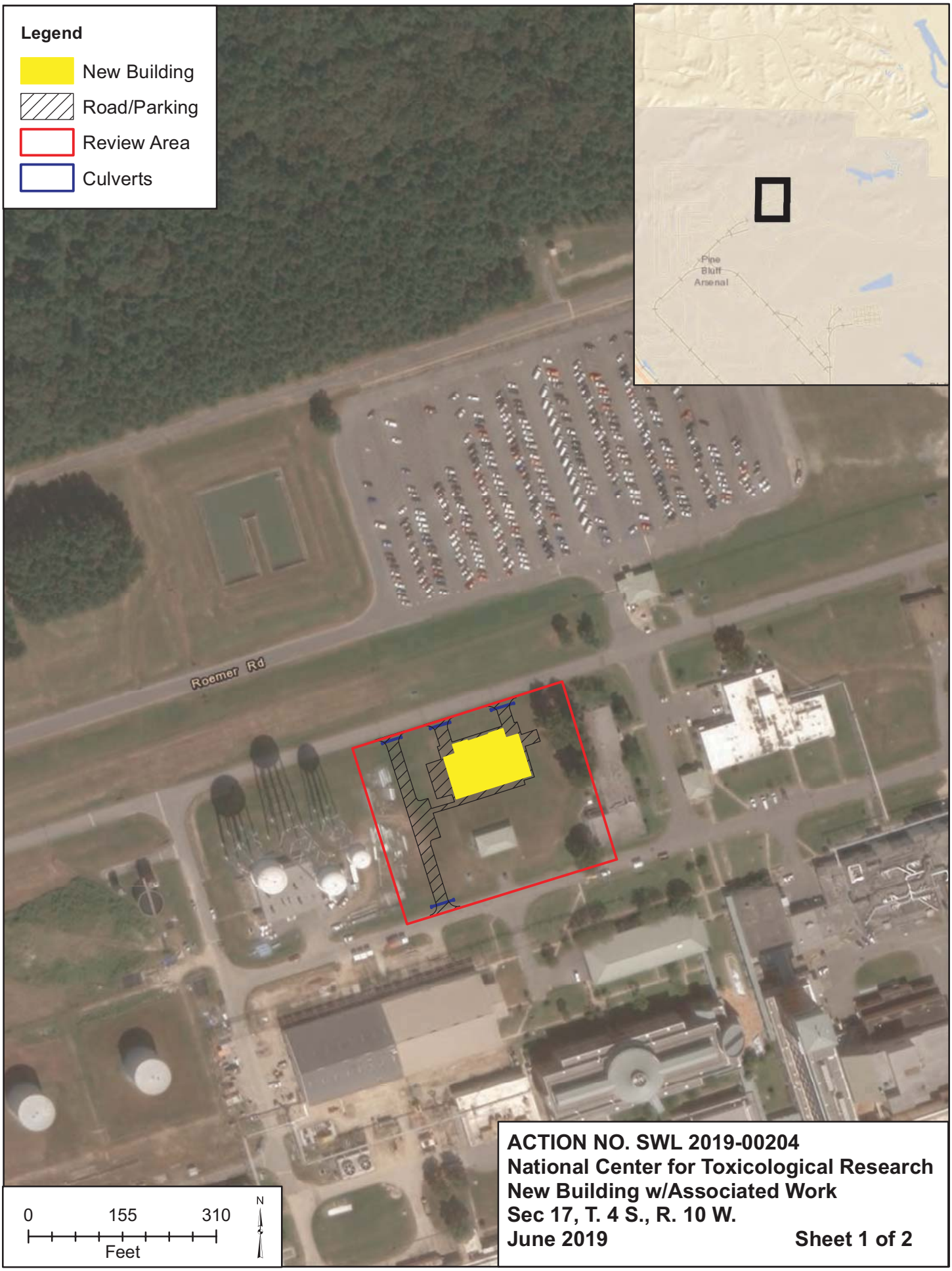
Sincerely,

Digitally signed by
DICKSON.GERALD.W

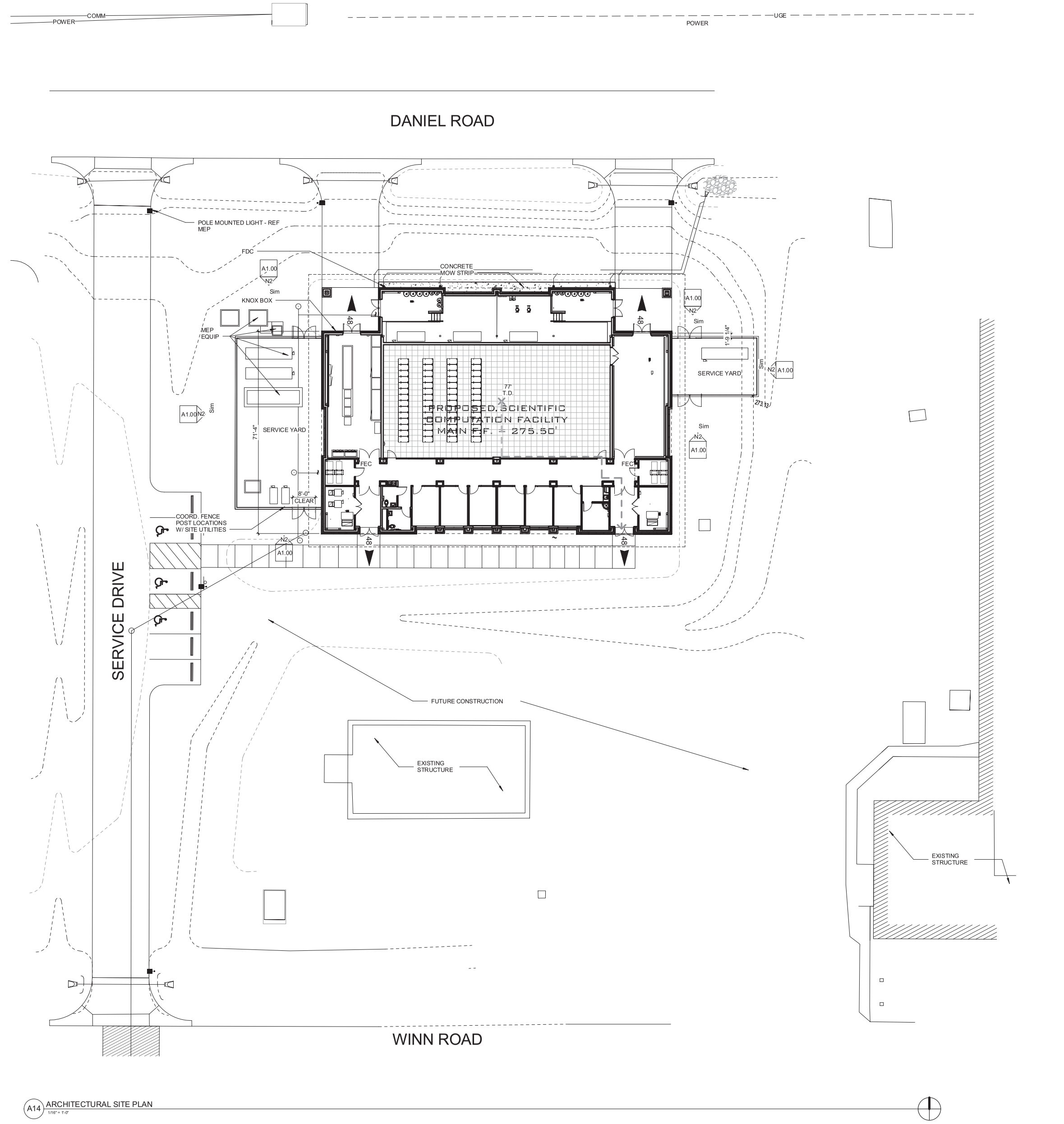
Gerald Dickson
Environmental Protection Specialist

Enclosures

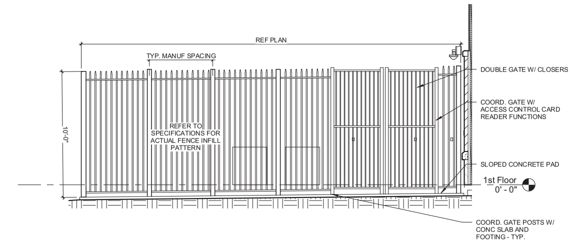
cc:
Mr. Greg Tapp, National Center for Toxicological Research
Proj Mgr, Pine Bluff PO
Ch, Regulatory Enf



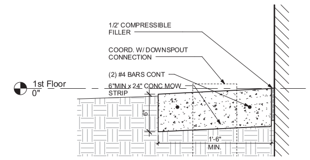
ACTION NO. SWL 2019-00204
National Center for Toxicological Research
New Building w/Associated Work
Sec 17, T. 4 S., R. 10 W.
June 2019 **Sheet 1 of 2**



A14 ARCHITECTURAL SITE PLAN



N2 SERVICE YARD FENCE



N5 CONCRETE MOW STRIP

FDA SCIENTIFIC COMPUTATION FACILITY

3900 NCTR Road, HFT_324
Jefferson, AR 72079

901 West Third Street
Little Rock, Arkansas 72201
501.374.5300
www.WERarch.com

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415 N. McKinley
Little Rock, AR 72205
501.664.6981

1 Allied Drive, Building 2
Little Rock, AR 72202
501.666.6776

928 Airport Road
Hot Springs, AR 71913
501.767.2366

Jefferson, AR

Seal

CONSTRUCTION DOCUMENTS

ACTION NO. SWL 2019-00204
National Center for Toxicological Research
New Building w/Associated Work
Sec 17, T. 4 S., R. 10 W.
June 2019
Sheet 2 of 2

Project Name
3/29/2019 6:36:38 AM

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **National Center for Toxicological Research**	File Number: **SWL 2019-00204**	Date: **21-Jun-19**

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
✓	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
Mr. Gerald Dickson U.S. Army Corps of Engineers (CESWL-RD) P.O. Box 867 Little Rock, Arkansas 72203-0867 501-324-5295	Mr. Elliott Carman Administrative Appeals Review Officer (CESWD-PD-O) U.S. Army Corps of Engineers 1100 Commerce Street, Suite 831 Dallas, Texas 75242-1317 469-487-7061

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
_____ Signature of appellant or agent.		

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): June 21, 2019

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: NCTR Data Center, SWL 2019-00204

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: Arkansas County/parish/borough: Jefferson City: Pine Bluff Arsenal
Center coordinates of site (lat/long in degree decimal format): Lat. 34.367629°, Long. -92.113060°
Universal Transverse Mercator: NAD 83/UTM Zone 15, 3803275.52 Northing, 581553.64 Easting
Name of nearest waterbody: Unnamed Tributary to Eastwood Bayou
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Arkansas River
Name of watershed or Hydrologic Unit Code (HUC): 11110207, Lower Arkansas-Maumelle

- [x] Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- [ ] Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

- [x] Office (Desk) Determination. Date: June 21, 2019
- [ ] Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.
There are no "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

- [ ] Waters subject to the ebb and flow of the tide.
- [ ] Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.
There are no "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. ***[Required]***

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      - [ ] TNWs, including territorial seas
      - [ ] Wetlands adjacent to TNWs
      - [ ] Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      - [ ] Non-RPWs that flow directly or indirectly into TNWs
      - [ ] Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      - [ ] Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      - [ ] Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      - [ ] Impoundments of jurisdictional waters
      - [ ] Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction based on:**
      Elevation of established OHWM (if known):

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - [x] Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
     Explain: The project review area contains two roadside stormwater ditches placed in uplands to drain the surrounding area. These roadside ditches are part of a bigger overall system to drain water from the surrounding area (approximately 115 acres).

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent":

B. Characteristics of Tributary (That Is Not a TNW) and Its Adjacent Wetlands (If Any):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size:
Drainage area:

Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

☐ Tributary flows directly into TNW.

☐ Tributary flows through tributaries before entering TNW.

Project waters are river miles from TNW.
Project waters are river miles from RPW.
Project waters are aerial (straight) miles from TNW.
Project waters are aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW[5]:
Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural

☐ Artificial (man-made). Explain:

☐ Manipulated (man-altered). Explain:

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes:

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:
Presence of run/riffle/pool complexes. Explain:
Tributary geometry:
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for:
Estimate average number of flow events in review area/year:
Describe flow regime:
Other information on duration and volume:

Surface flow is: Characteristics:

Subsurface flow: Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain:
Identify specific pollutants, if known:

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width):
- ☐ Wetland fringe. Characteristics:
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings:
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☐ Aquatic/wildlife diversity. Explain findings:

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain:
Wetland quality. Explain:
Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:
Flow is: Explain:

Surface flow is:
Characteristics:

Subsurface flow: Explain findings:
- ☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:
- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain:
  - ☐ Ecological connection. Explain:
  - ☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW
Project wetlands are river miles from TNW.
Project waters are aerial (straight) miles from TNW.
Flow is from:
Estimate approximate location of wetland as within the floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width):
- ☐ Vegetation type/percent cover. Explain:
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings:
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☐ Aquatic/wildlife diversity. Explain findings:

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis:
Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters:

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters:

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

     Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.**[9]
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain:
- ☐ Other factors. Explain:

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters:
- ☐ Wetlands: acres.

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
- ☐ ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☑ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: The project review area contains two roadside stormwater ditches placed in uplands to drain the surrounding area. The stormwater ditched are part of a larger drainage system utilizing road side ditches and piping to convey the water run off to the unnamed tributary. While there is a small chemical and physical connection, the piping and complexity of the system prevents/minimizes the probability of a biological connection.
- ☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- ☑ Non-wetland waters (i.e., rivers, streams): 720 linear feet, 5 width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Application package from applicant's agent received on June 11, 2019.
- ☑ 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:
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas: 11110207, Lower Arkansas-Maumelle
  - ☑ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite scale & quad name: 24K, White hall
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: Jefferson County NRCS Soil Survey
- ☐ National wetlands inventory map(s). Cite name:
- ☐ State/Local wetland inventory map(s):
- ☐ FEMA/FIRM maps:
- ☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- ☐ Photographs: ☑ Aerial (Name & Date): Google Earth and ArcGIS accessed on 6/21/2019
- ☐ or ☑ Other (Name & Date): Photographs provided in application package
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Applicable/supporting case law:
- ☐ Applicable/supporting scientific literature:
- ☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD: The project review area contains two roadside stormwater ditches placed in uplands to drain the surrounding area. The applicant's agent performed a WoUS delineation of the review area and did not find any wetlands present.

Digitally signed by
DICKSON.GERALD.W

June 21, 2019

Gerald Dickson
Environmental Protection Specialist

Date

Appendix D

U.S. Fish and Wildlife Species List and Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
Phone: (501) 513-4470 Fax: (501) 513-4480
http://www.fws.gov/arkansas-es

In Reply Refer To: September 25, 2018
Consultation Code: 04ER1000-2018-SLI-1599
Event Code: 04ER1000-2018-E-02554
Project Name: Jefferson Labs Campus Development Project

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

To Whom It May Concern:

The enclosed species list identifies endangered, threatened, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). **This letter only provides an official species list and technical assistance; if you determine that listed species and/or designated critical habitat may be affected in any way by the proposed project, even if the effect is wholly beneficial, consultation with the Service will be necessary.**

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found on our website.

Please visit our website at http://www.fws.gov/arkansas-es/IPaC/home.html for species-specific guidance to avoid and minimize adverse effects to federally endangered, threatened, proposed, and candidate species. Our web site also contains additional information on species life history and habitat requirements that may be useful in project planning.

If your project involves in-stream construction activities, oil and natural gas infrastructure, road construction, transmission lines, or communication towers, please review our project specific guidance at http://www.fws.gov/arkansas-es/IPaC/ProjSpec.html.

The karst region of Arkansas is a unique region that covers the **northern third of Arkansas** and we have specific guidance to conserve sensitive cave-obligate and bat species. **Please visit http://www.fws.gov/arkansas-es/IPaC/Karst.html to determine if your project occurs in the karst region and to view karst specific-guidance.** Proper implementation and maintenance of best management practices specified in these guidance documents is necessary to avoid adverse effects to federally protected species and often avoids the more lengthy formal consultation process.

If your species list includes any mussels, Northern Long-eared Bat, Indiana Bat, Yellowcheek Darter, Red-cockaded Woodpecker, or American Burying Beetle, your project may require a presence/absence and/or habitat survey prior to commencing project activities. Please check the appropriate species-specific guidance on our website to determine if your project requires a survey. We strongly recommend that you contact the appropriate staff species lead biologist (see office directory or species page) prior to conducting presence/absence surveys to ensure the appropriate level of effort and methodology.

Under the ESA, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service, to make “no effect” determinations. If you determine that your proposed action will have “no effect” on threatened or endangered species or their respective critical habitat, you do not need to seek concurrence with the Service. Nevertheless, it is a violation of Federal law to harm or harass any federally-listed threatened or endangered fish or wildlife species without the appropriate permit.

Through the consultation process, we will analyze information contained in a biological assessment that you provide. If your proposed action is associated with Federal funding or permitting, consultation will occur with the Federal agency under section 7(a)(2) of the ESA. Otherwise, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA (also known as a habitat conservation plan) is necessary to harm or harass federally listed threatened or endangered fish or wildlife species. In either case, there is no mechanism for authorizing incidental take “after-the-fact.” For more information regarding formal consultation and HCPs, please see the Service's Consultation Handbook and Habitat Conservation Plans at www.fws.gov/endangered/esa-library/index.html#consultations.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, **the accuracy of this species list should be verified after 90 days.** This verification can be

completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

Arkansas Ecological Services Field Office
110 South Amity Suite 300
Conway, AR 72032-8975
(501) 513-4470

Project Summary

Consultation Code: 04ER1000-2018-SLI-1599

Event Code: 04ER1000-2018-E-02554

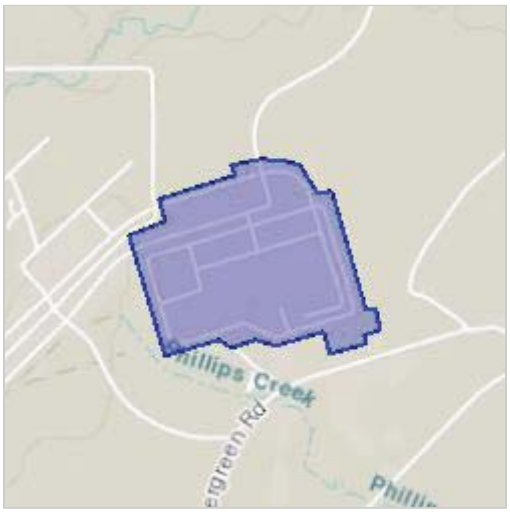
Project Name: Jefferson Labs Campus Development Project

Project Type: DEVELOPMENT

Project Description: The FDA is performing a NEPA EA for the construction of several new buildings and the upgrade of existing infrastructure within the Jefferson Labs campus in Jefferson, AR. The proposed project is located at 3900 NCTR Road in Jefferson, AR. The location map below depicts the proposed project's area of potential effect for all construction activities and work involved. All proposed work will be performed within the existing campus boundaries.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/34.36711948032581N92.1124986965515W



Counties: Jefferson, AR

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

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

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

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

---

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

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened

Critical habitats

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

From: Bangs, Alyssa
To: Hope Sharp
Subject: Re: [EXTERNAL] Jefferson Labs Project - 04ER1000-2018-SLI-1599
Date: Monday, December 3, 2018 9:24:33 AM

Hello Hope,

Thank you for notifying the Service of your "no effect" determination for this project. You have completed Section 7 consultation requirements for this project by notifying us of your "no effect" determination for the Piping Plover.

Let me know if you have any questions.

Thank you,
Alyssa Bangs
Fish and Wildlife Biologist

U.S. Fish and Wildlife Service
Arkansas Ecological Services Field Office
110 South Amity Road, Suite 300
Conway, AR 72032
501-513-4472 (phone) / 501-730-3698 (cell) / 501-513-4480 (fax)
alyssa_bangs@fws.gov

On Fri, Nov 30, 2018 at 8:49 AM Hope Sharp <HSharp@pmico.com> wrote:

> Alyssa,
>
> PMI is representing the Food and Drug Administration (FDA) on their Jefferson Labs Campus Development Project. After review of the IPaC letter/species list and per our discussion, the FDA has determined that the proposed project will have no effect on the federally listed Piping Plover *(Charadrius melodus)*.
>
> Respectfully,
>
> **Hope Sharp**
>
> Project Manager – Environmental Division
>
> PMI | 3512 S. Shackleford Rd. | Little Rock, AR 72205
>
> o: 501.221.7122

Appendix E

Cultural Resources Survey and Arkansas Historic Preservation Program Correspondence

PANAMERICAN REPORT NO. 39011

PANAMERICAN CONSULTANTS, INC.

CULTURAL RESOURCES SURVEY FOR THE FDA'S JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT, JEFFERSON COUNTY, ARKANSAS

PREPARED FOR:

POLLUTION MANAGEMENT, INC.
3512 SOUTH SHACKLEFORD ROAD
LITTLE ROCK, ARKANSAS 72205

PREPARED BY:

PANAMERICAN CONSULTANTS, INC.
91 TILLMAN STREET
MEMPHIS, TENNESSEE 38111

FINAL REPORT ♦ APRIL 2019

Cover Figure: Cold War-era Building 52 south and west façades; view northeast within renovated Building 50 on left (DSCN1576).

FINAL REPORT

CULTURAL RESOURCES SURVEY FOR THE FDA'S JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT, JEFFERSON COUNTY, ARKANSAS

Lead Agency:

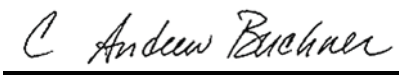
U.S. Food and Drug Administration

Prepared for:

Pollution Management, Inc.
3512 South Shackleford Road
Little Rock, Arkansas 72205

Prepared by:

Panamerican Consultants, Inc.
91 Tillman Street
Memphis, Tennessee 38111
Panamerican Project No. 39011



C. Andrew Buchner, RPA
Principal Investigator and Author

APRIL 2019

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ABSTRACT

At the request of Pollution Management, Inc., Panamerican Consultants, Inc. performed a Phase I cultural resources survey for the FDA's Jefferson Labs campus development project in Jefferson County, Arkansas. The FDA's Jefferson Lab and the National Center for Toxicological Research are housed in a complex of buildings that were originally constructed during 1951-1952 for the U.S. Army's biological weapons research and production facility at the Pine Bluff Arsenal. Review of AAS, AHPP and NRHP databases revealed that there are no previously recorded historic properties within the campus. However, a 2005 preliminary NRHP eligibility assessment for the FDA's Jefferson Labs suggested that three standing structures within the campus were individually potentially eligible under Criteria A for their association with the U.S. Army's Cold War biological weapons program: Building 5A-D, Building 37, and Building 52/85A-C. The archaeological survey of the Jefferson Labs campus, including the excavation of 68 shovel tests, produced negative findings; no artifacts or cultural deposits were identified.

As there are no archaeological resources within the Jefferson Labs campus, no additional archaeological investigations are recommended. The two potentially NRHP eligible aboveground properties within the campus that are slated for demolition require an additional assessment (Building 37 and Building 52/85A-C). The third potentially NRHP eligible aboveground property within the campus (Building 5A-D) will not be impacted under the current design plans; however, if these plans change, then additional architectural documentation could be required here as well.

ACKNOWLEDGEMENTS

Panamerican Consultants, Inc. appreciates the opportunity to have provided Pollution Management, Inc. with our services. Hope Sharp was the project manager.

At Jefferson Labs, Tommy Baioni escorted the crew during the survey, and Greg Tapp provided some archival materials.

Panamerican Consultants, Inc. personnel who contributed to the project include the following. Andrew Saatkamp, RPA was the Field Director. Allie Mansfield served as the Archaeological Technician. Hannah Fite entered the shovel test data. Anna Hinnenkamp-Faulk assisted with report production. Kate Gilow provided administrative support during all phases of the project.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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I. INTRODUCTION

At the request of Pollution Management, Inc. (PMI), Panamerican Consultants, Inc. (Panamerican) performed a Phase I cultural resources survey for the Jefferson Labs campus development project in Jefferson County, Arkansas. The purpose of this study was to create an inventory of all cultural resources present within the campus, and to provide appropriate management recommendations for their treatment.

The project was conducted to assist PMI and U.S. Food and Drug Administration (FDA) in complying with Federal statutes including Section 106 of the National Historic Preservation Act of 1966, as amended; Executive Order 11593, and the Advisory Council's "Protection of Historic Sites (36 CFR Part 800)", effective 17 June 1999, and Arkansas State Historic Preservation Officer (SHPO) guidelines. All field and office work was conducted in accordance with the Standards and Guidelines established in 36 CFR Part 66, Recovery of Scientific, Prehistoric, Historic, and Archaeological Data: Methods, Standards and Reporting Requirements (Federal Register, Volume 42, Number 19-Friday, 18 January 1977), and Appendix B of the Arkansas State Plan: *Guidelines for Archeological Fieldwork and Report Writing in Arkansas* (Revised Version in effect as of 1 January 2010).

PROJECT BACKGROUND

The FDA's Jefferson Lab and the National Center for Toxicological Research (NCTR) are housed in a complex of buildings that were originally constructed during 1951-1952 for the U.S. Army's biological weapons research and production facility at the Pine Bluff Arsenal (Nolte et al. 2002:3-26; Robinson & Associates, Inc. 2005:11). The proposed undertaking will consist of the demolition of several aging structures, the construction of several new buildings and the upgrade of the existing infrastructure within the approximately 100 ac. (40.5 ha) Jefferson Labs campus (Figures 1-01, 1-02, 1-03 and 1-04).

Specifically, Buildings B06, B13, B16, B17, B20, B31, B37, B15/53, B46, B51, B60, B62, and B52/85 will be removed due to poor condition and lack of functionality (see Figure 1-03). The empty 1,000,000-gallon aboveground storage tanks (ASTs) located on the northwestern portion of the campus will also be removed. The temporary structure T45 will be replaced with a permanent structure. Buildings B05B, B05C and B05D will be consolidated into an archive facility and receiving/distribution/storage facility.

The plan includes the development of the following structures:

- SCF Data Center, SCF Office Tower and Café & Conference Center on the north-central portion of Campus
- Two (2) CAFF Buildings and the future ETF lab facility on the northeastern portion of Campus
- Energy plant & cooling tower on the western portion of Campus (location of the western 1,000,000-gallon AST)
- Renovation of B10 to include a fitness center on the western portion
- Replacement facility for B62 (labs, primates and imaging) on the eastern portion of the campus
- Chilled water line that follows the northern perimeter road of the Campus
- Sewer line main along the eastern perimeter road of the Campus
- Pedestrian walkways and landscaping throughout the interior areas of the Campus

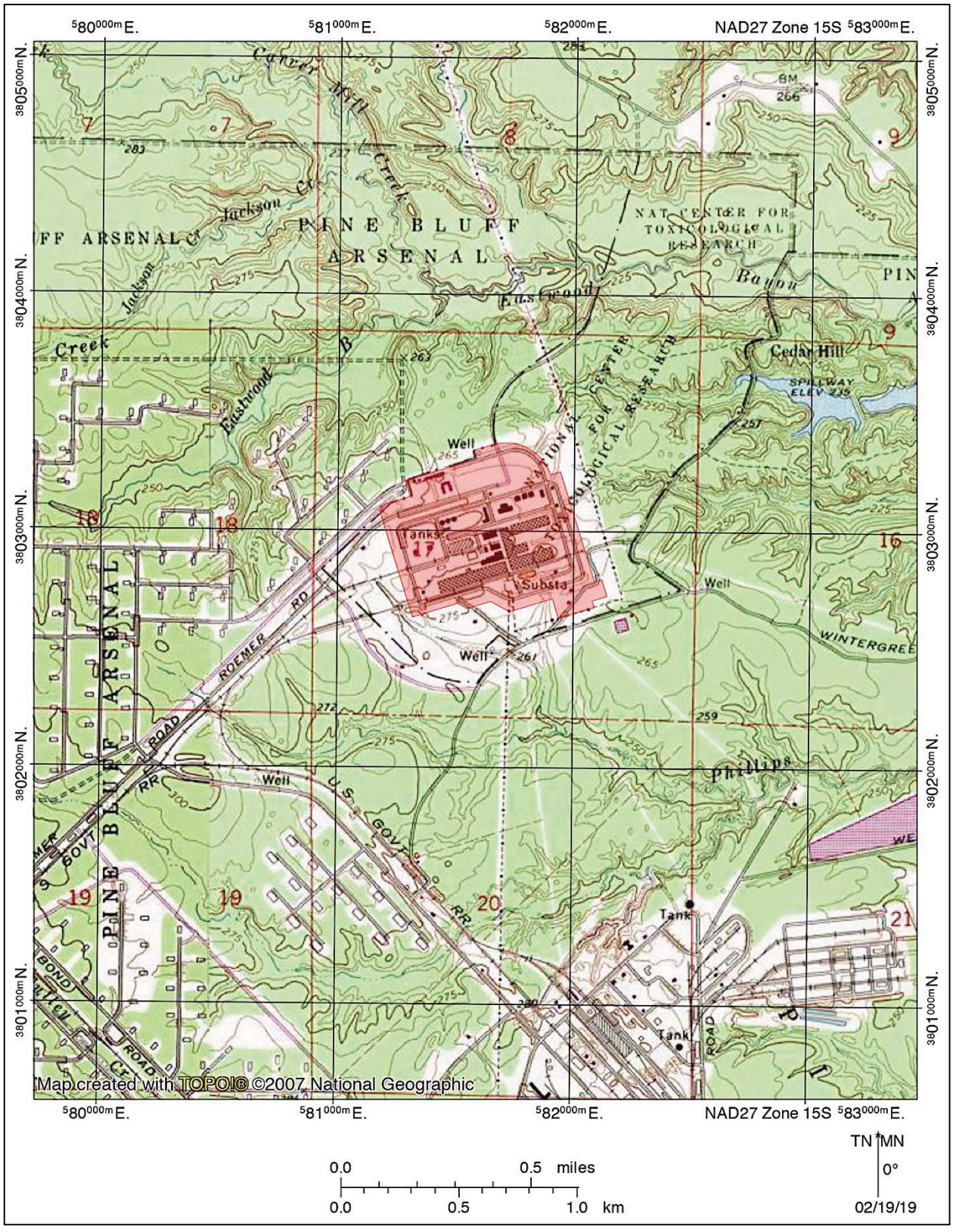

Figure 1-01. Jefferson Labs campus shown on the White Hall, AR 7.5-min. quad. 1982 edition.

The SHPO Section 106 review letter for this undertaking, dated September 24, 2018 (AHPP Tracking No. 102261) recommended that a cultural resources survey be conducted within the area of potential effect (APE). Additionally, the SHPO noted that eight Native American Tribes have an expressed interest in this area and should be consulted.

PROJECT LOCATION

The FDA Jefferson Labs campus and NCTR facility is located at the northern end of the sprawling Pine Bluff Arsenal, and is approximately 18 km northwest of the Jefferson County Courthouse in Pine Bluff. The facility address is 3900 NCTR Road in Jefferson, Arkansas. The Arkansas River (River Mile 81) is approximately 3.5 km east of the facility. Under the Township-Range system, the campus is found within Section 17 of Township 4 South Range 10 West (T4S R10W).

OUTLINE OF THE REPORT

The technical report that follows is organized in the following manner (see also *Table of Contents*). The most salient aspects of the local environmental setting area are outlined in Chapter II. The local culture history is reviewed in Chapter III. The results of the literature and records search are presented in Chapter IV. The survey's field methods and results are presented in Chapter V. Chapter VI provides a summary and conclusions. The report concludes with a references cited section. Additional appendices include the biographies of the key personnel, and copies of the SHPO correspondence.

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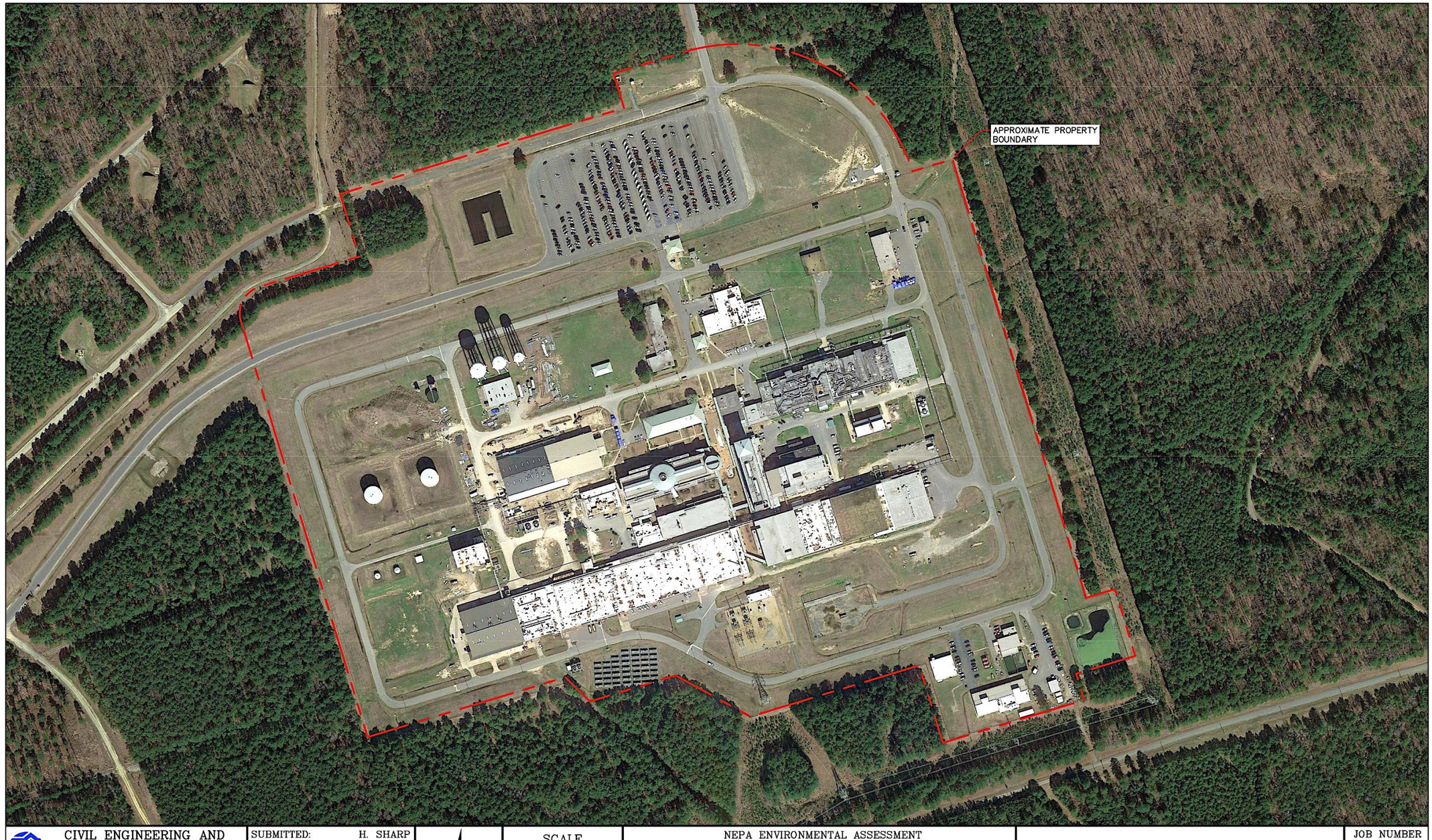
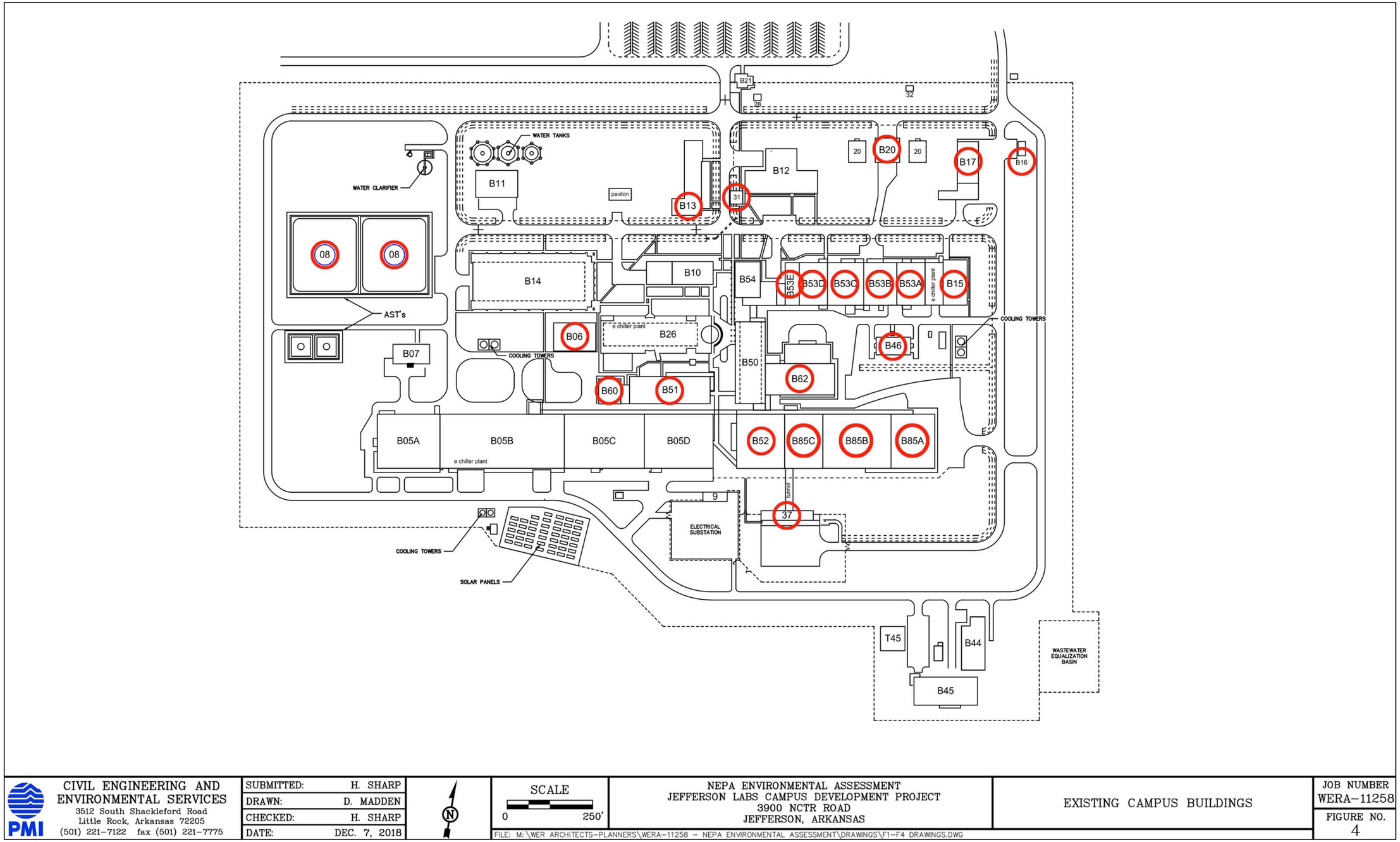


Figure 1-02. Aerial site plan of the NCTR campus (map courtesy: PMI).



PMI CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES 3512 South Shackleford Road Little Rock, Arkansas 72205 (501) 221-7122 fax (501) 221-7775	SUBMITTED: H. SHARP DRAWN: D. MADDEN CHECKED: H. SHARP DATE: DEC. 7, 2018	N	SCALE 0 250'	NEPA ENVIRONMENTAL ASSESSMENT JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT 3900 NCTR ROAD JEFFERSON, ARKANSAS	EXISTING CAMPUS BUILDINGS	JOB NUMBER WERA-11258 FIGURE NO. 4

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Figure 1-03. Plan view of the existing NCTR campus (map courtesy: PMI). Structures slated for removal are circled in red.

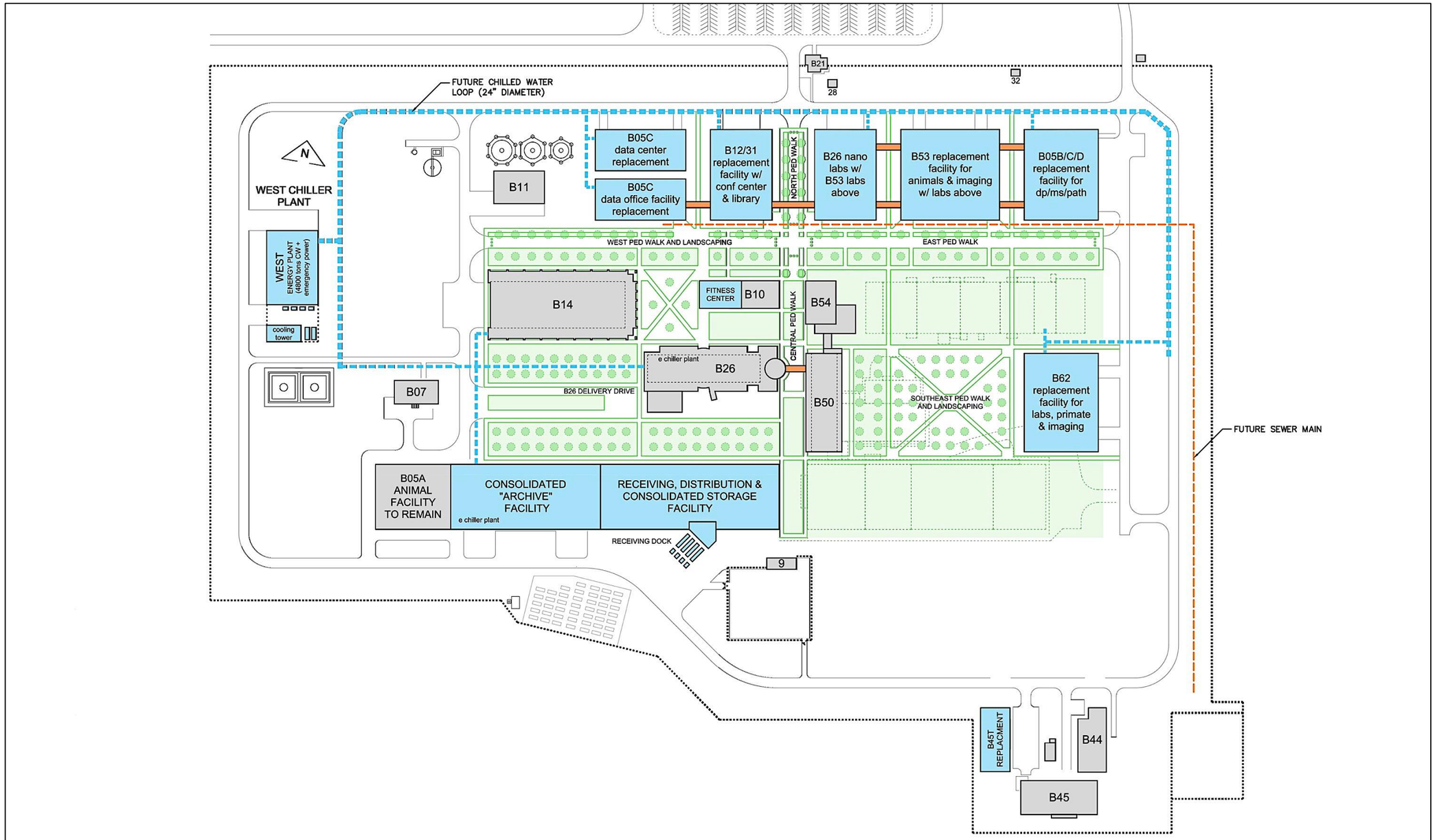

Figure 1-04. Plan view of the proposed NCTR campus (map courtesy: PMI).

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II. ENVIRONMENTAL SETTING

PHYSIOGRAPHY

The Jefferson Labs campus is located within the South Central Plain, a Level III ecoregion (Figure 2-01). This area is synonymous with the West Gulf Coastal Plain of older literature, and it covers 52 percent of Arkansas (Croneis 1930:7; Fenneman 1938). Here elevations range 100–700 ft. above mean sea level (amsl) with the lower areas in the southern portion (Croneis 1930:11). In general, the terrain is rolling and broken by stream valleys.

The South Central Plain is subdivided into six Level IV ecoregions, and the Jefferson Labs campus falls along the boundary of two of these. Most of the Pine Bluff Arsenal is associated with an extensive tract of Pleistocene Fluvial Terraces (35c) that flanks the Mississippi Alluvial Plain (i.e., Arkansas River meander belt) in the Pine Bluff vicinity. The terraces cover 3,352 mi.^{2}, and the physiography is characterized by broad flat, stream terraces, from lowest to highest they include: Deweyville; Prairie; and Intermediate. Mounds can occur on the Prairie terrace and seeps occur where terrace levels abut.

The area west of the Pleistocene Fluvial Terraces is considered Tertiary Uplands (35a). At 5,761 mi.^{2}, the Tertiary Uplands is the most extensive Level IV ecoregion within the South Central Plain in Arkansas, and the physiography is characterized as a rolling plain with occasional sand hills (Woods et al. 2004).

A short distance east of the Jefferson Labs campus, there is a major physiographic shift, as the terrain drops down into the Mississippi Alluvial Plain (a Level III ecoregion). As a result there are a number of prominent bluffs on the west side of the Arkansas River in this area, including Tripletts Bluff near Jefferson Labs, and Yellow Bluff and Pine Bluff farther downstream.

GEOLOGY

Geologically, a majority of the West Gulf Coastal Plain is composed of "clay, sandstone, marl, chalk, conglomerate, and lignite, and range in age from early Cretaceous to Quaternary" (Croneis 1930:7-8). The geology of the Tertiary Uplands consists of poorly consolidated Tertiary coastal plain and marine margin deposits largely consisting of non-calcareous sand, silt, clay, and gravel. In Jefferson Labs vicinity the dominant Tertiary formation is the Jackson Group (Tj). The Jackson Group is composed of fossiliferous, calcareous, glauconitic clays, glauconitic fine-grained sands, and carbonaceous silts and clays that were deposited in a marine environment.

In contrast, the Pleistocene Fluvial Terraces (Qt) are characterized by Pleistocene-aged fluvial terrace deposits containing unconsolidated gravels, sandy gravels, sands, silty, sands, silts, clayey silts, and clays that are mantled by loess (windblown clay).

DRAINAGE

The Jefferson Labs campus is located along a minor local drainage divide between Eastwood Bayou and its tributaries to the north and east, and tributaries of Phillips Creek to the south. Both Eastwood Bayou and Phillips Creek are short tributaries of the Arkansas River that are wholly contained within T4S R10W. Eastwood Bayou empties into Arkansas River above (north) of Tripletts Bluff, and Phillips Creek empties into the Arkansas River downstream, between Tripletts Bluff and Yellow Bluff.

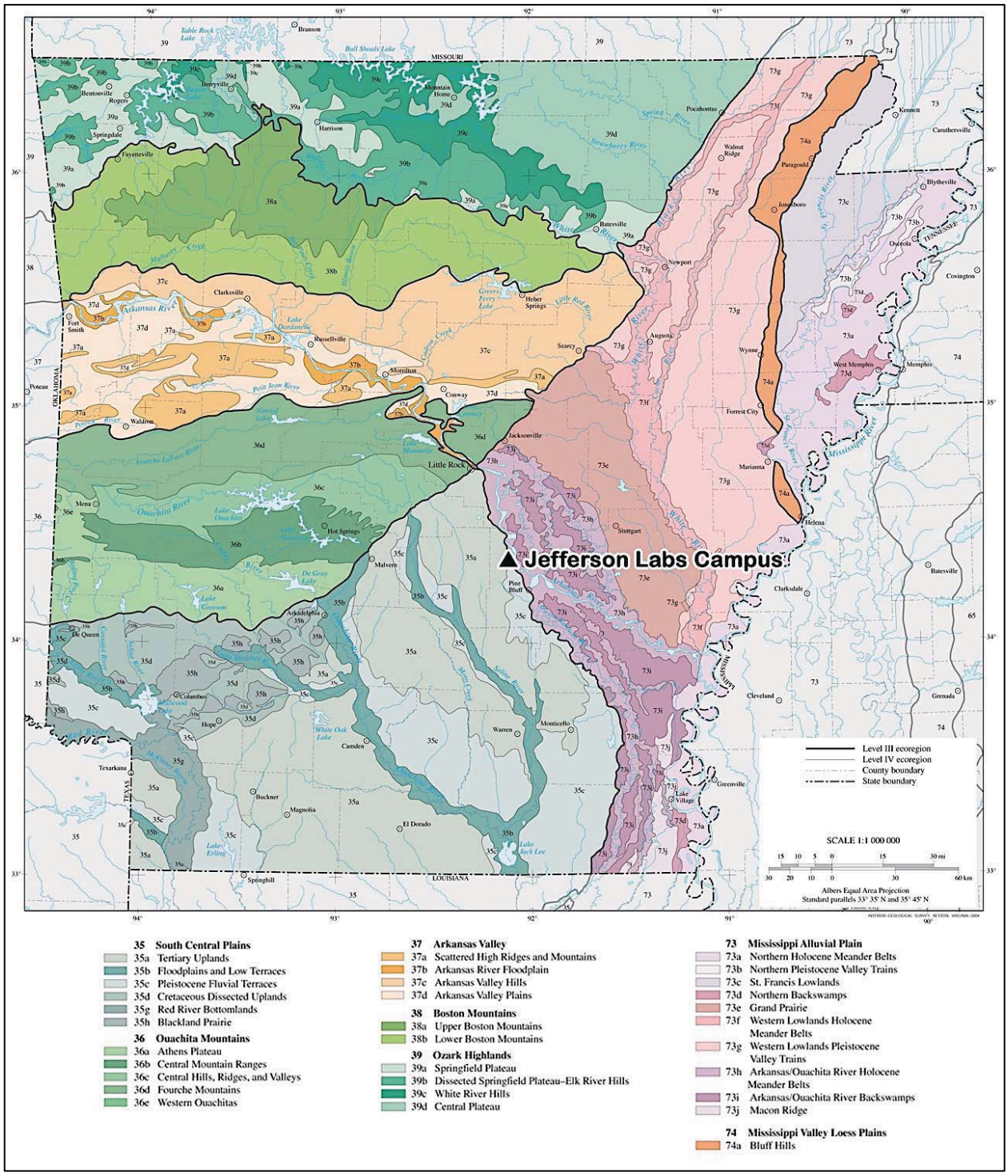

Figure 2-01. Study area shown on an Ecoregions of Arkansas map (after Woods et al. 2004).

The Arkansas River has it origins in the Rocky Mountains near Leadville, Colorado, and extends 1,469 mi. east across Kansas, Oklahoma, and Arkansas (U.S. Geological Survey 1990). Its watershed covers nearly 170,000 mi.^{2}, and also captures water from portions of Texas, New Mexico, and Missouri. The lower 445 mi. of the Arkansas River—from the Mississippi River to

Catoosa, Oklahoma—is navigable to barges and large river craft because of a series of locks and dams referred to as the McClellan-Kerr Arkansas River Navigation System. The Colonel Charles D. Maynard Lock and Dam No. 5 is the nearest structure on the McClellan-Kerr Arkansas River Navigation System to the Jefferson Labs; it is 4.6 km to the north.

SOILS

At the county level, the Jefferson Labs campus falls within the Pheba-Savannah-Amy soil association (Gill et al. 1980:General Soil Map). The Pheba-Savannah-Amy association is described as "poorly drained to moderately well drained, level to gently sloping, loamy soils on uplands and stream terraces" (Gill et al. 1980:4). These soils formed in thick beds of loamy sediment, and occur on broad flats broken by ridges.

More specifically, two soil types are mapped with the Jefferson Labs campus (Gill et al. 1980:Sheets 16 and 23). The majority of the campus is composed of Savannah fine sandy loam, 3 to 8 percent slopes. This is a moderate well drained, gently sloping soil on the uplands of the Coastal Plain. The surface layer is yellowish brown fine sandy loam to 9 in., and the subsoil above the fragipan is yellowish brown loam to 24 in. (Gill et al. 1980:26). It is a capability unit IIIe-1 soil.

Small portions on the northern and southern edges of the campus are mapped as Pheba silt loam, 0 to 2 percent. This is a somewhat poorly drained, nearly level soil on the smoother parts of the Coastal Plain (Gill et al. 1980:21). Typically the surface layer is dark grayish brown silt loam to 4 in., and the subsurface stratum is pale brown silt loam to 9 in. The upper portion of the subsoil is light yellowish brown mottled silt loam. It is a capability unit IIIw-4 soil.

FLORA AND FAUNA

The loblolly-shortleaf pine forest group dominates the West Gulf Coastal Plain. Over 50 percent of the trees in this category are varieties of the southern pine group. The upland forests of this area have much in common with the Oak-Hickory region, which is adjacent to the north. The transition from the Oak-Hickory to the Oak-Pine is indicated not by a boundary but more of an overlap. These forests are often comprised of a massive assortment of different species (Braun 1950).

Woods et al. (2004) characterize the native vegetation of the Tertiary Uplands as a mixed shortleaf pine-loblolly pine forest and upland deciduous. The native vegetation of the Pleistocene Fluvial Terraces is similar, but extensive pine flatwoods are found that are adapted to seasonally wet conditions.

The vegetation of the lowlands in the Coastal Plain includes dense stands of bald cypress in the swampy areas, whereas hardwoods occupy most of the poorly drained soils. In lower areas that are wet but not swampy, water tupelo, sweet gum, soft elm, green ash, hackberry, cottonwood, overcup oak, and willow oak are the most common tree species (Braun 1950).

Faunal species occupying these communities include: large mammals, such as the white-tailed deer (*Odocoileus virginianus*) and black bear (*Ursus americanus*); smaller mammals, such as opossum (*Didelphis marsupialis*), raccoon (*Procyon lotor*), rabbit (*Sylvilagus* sp.), beaver (*Castor canadensis*), otter (*Lutra canadensis*), and squirrel (*Sciurus* sp.); and large terrestrial birds, including wild turkey (*Meleagris gallapavo*). Riverine species within these communities would have included: fish species, such as bass (*Micropterus* sp.), catfish (*Ictalurus* sp.), sunfish (*Lepomis* sp.), drum (*Aplodinotus grunniens*), and gar (*Lepisosteus* sp.). All the faunal species, described immediately above, would have offered important subsistence resources for humans.

PRESENT CLIMATE

The Late Holocene (i.e., present) climate of Central Arkansas is characterized by warm summers with relatively mild winters. During the late spring, summer, and early fall, sunlight is quite intense, which keeps the humidity and soil moisture evaporation levels high. Winters in this area are characterized by cool and cloudy weather coupled with frequent rainfall, interspersed with periods of clear and cold conditions. Warm, rainy periods occur intermittently during the winter months as well.

In Jefferson County, July is, on average, the warmest month with a mean daily maximum temperature of 93.4° F, and an average daily minimum temperature of 71.9° F (Gill et al. 1980:Table 3). The coldest month is, on average, January with an average daily maximum temperature of 54.2° F, and an average daily minimum temperature of 34.2° F (Gill et al. 1980:Table 3). The growing season in Jefferson County is long, ranging 211–256 days with temperature above 32°F (Gill et al. 1980:Table 5).

Precipitation in Jefferson County averages 50.28 in. per annum (Gill et al. 1980:Table 3). The wettest months are March, April, and May, when averages of between 4.74 and 5.45 in. of precipitation falls each month. Frontal systems associated with areas of low pressure provide the area with the majority of its rainfall. During summer months, convection clouds, caused by high temperatures and humidity levels, provide rainfall frequently during the afternoon hours. The driest month, on average, is October (3.10 in.). Periods of drought are infrequent.

III. CULTURAL CONTEXT

The Jefferson Labs campus lies within the Arkansas River Lowland archaeological region as defined in the *State Plan* (Davis ed. 1982, revised 2010:RSU6). The Arkansas River Lowland Region is located within the Southeast section and consists "of Fisk's Arkansas River Lowland plus the portion of the Boeuf Basin south of the Arkansas River plus the Arkansas and Bayou Bartholomew watershed portions of the adjoining West Gulf Cost Coastal Plain" (Jeter et al. 1982:SE4). This area has a long history of archaeological research, in part, because it is the heartland of Plum Bayou culture. The Prehistoric and Historic sequences of this area are briefly reviewed below.

PREHISTORIC SEQUENCE

PALEOINDIAN

Paleoindian occupations represent the first well-accepted occurrence of humans in the Western Hemisphere. These populations are generally thought of as highly adaptive and mobile hunter-gatherers whose recent ancestors were Upper Paleolithic Siberians who migrated across the present Bering Strait during the Late Pleistocene, when sea levels were ca. 60 m lower. During the Late Glacial era, when initial human colonization of the Southeast is postulated (ca. 12,000–10,000 BP), climatic changes followed the receding of the continental ice sheets, and there was a widespread extinction of megafauna. Aboriginal groups of the period were likely small, mobile bands dependent upon a hunting-and-gathering economy. Although they may have hunted some of the megafauna that became extinct at the end of the Pleistocene, such as mastodon (*Mammut americanum*), bison (*Bison bison antiquus*), and ground sloth (*Megalonyx* sp.), it is likely that the subsistence base was varied and included a number of plant and animal foods.

Paleoindian occupations (9500–8500 B.C.) represent the earliest occurrence of humans in Central Arkansas. The key diagnostic artifacts are fluted lanceolate points. However there is "scant" evidence for Paleoindian occupation of the Arkansas River Lowland (House 1996:138). In East-Central Arkansas there are only two documented fluted points finds (3PH32 and 3MO68), although House (1996:140) indicates that a few additional fluted specimens exist in private collections. The single example from the Lower White River is an isolated chalcedony Clovis point (3MO68 site file) recovered in 1997 from the late Wisconsin terrace at Clarendon. The 3PH32 find is a Ross County or Eastern Clovis point from an early Wisconsin-aged surface in Phillips County (House 1996:140). To the west of the study area, in the upper and middle sections of the Saline River basin, no fluted points have been reported (Jeter and Early 1999:40).

DALTON PERIOD

The Dalton period (8500–8000 B.C.) is transitional between the Paleoindian and Archaic traditions. The dates offered for the Dalton period follow Morse and Morse (1983; but see McNutt (1996:192) for enlightenment regarding other views on the terminal dating of Dalton). The key diagnostic is the Dalton point. This point is associated with exploitation of white-tailed deer and smaller animals (i.e., not megafauna). Based on specimens from the Sloan Site (3GE94) in Greene County, Morse (1997) indicates there are several Dalton variants including Sloan, Large Dalton, Beveled Dalton, and Unbeveled Dalton. Other well-known Dalton varieties include *vars. Colbert* and *Greenbrier* (Cambron and Hulse 1986). Dalton period diagnostics also include awls, burins, and scrapers made on Dalton points, and a specialized woodworking tool: the Dalton adze.

When viewed in a regional context, reported Dalton components in the study area—similar to the preceding Paleoindian component pattern—are far less frequent and peripheral to the major

concentration in Northeast Arkansas (Morse 1997). House (1982a:SE6) mentions two fluted and basally thinned Dalton points from the "Hensley locality" in Pulaski County that are similar to a third specimen from 3PU24. Perhaps as many as 24 Dalton components have been recovered along remnant Pleistocene terraces adjoining the Arkansas River Lowlands (House 1982a). Schambach and Early (1982) suggest that there was probably a major Dalton presence in Southwest Arkansas. However, in the Saline River Basin, west of the study area, only one Dalton component has been professionally investigated (Jeter and Early 1999:40).

SAN PATRICE COMPLEX

San Patrice is a "poorly understood and understudied" post-Dalton projectile point/knife (PP/K) style in use from approximately 8400 to 7000 B.C. (Jennings 2008:54). Jeter and Early (1999:41) place the San Patrice Complex at 8000–7500 B.C. The San Patrice complex "heartland" is northwestern Louisiana and the adjacent portion of eastern Texas, but the distribution extends northward into Arkansas and southwestern Missouri, eastward into Mississippi, and westward into Oklahoma and Texas (Jennings 2008:Figure 2). Raw material sourcing suggests San Patrice groups occupied "at least" three distinct territories, and a fourth territory is proposed to have existed in Arkansas, but more data are needed to refine the Arkansas San Patrice occupation (Jennings 2008:554). House (1996:140) reports that San Patrice points are found in small numbers throughout East-Central Arkansas. One San Patrice site (3AS40) is reported in the Saline River basin (Jeter and Early 1999:41).

EARLY ARCHAIC PERIOD

The Archaic period extends for approximately six millennia following the Dalton period. Archaic lifeways are characterized by a hunter-gatherer economy designed to efficiently utilize Holocene natural communities (cf. Caldwell 1958). An increasing human awareness of the seasonal availability of the local resources led to the development of cyclical patterns in behavior. The repetitive nature of the Archaic adaptive strategies is reflected in a number of archaeological attributes, including settlement patterns, technology, and diet. For most of the Archaic period, the key diagnostic artifacts continue to consist largely of projectile points.

Early Archaic points in southeastern Arkansas include Big Sandy, Graham Cave Side-notched, and Johnson types (House 1982a:SE9). Early Archaic components are reported from "land surfaces dating to the Pleistocene or earlier in the Grand Prairie … and along the escarpment bordering the Arkansas River Lowland between Pine Bluff and Little Rock" (House 1982a:SE9). Within the Arkansas River Lowland, it is noted that Early Archaic diagnostics are restricted to locations where "ancient terrace surfaces" protrude "through Holocene alluvium" (House 1982a:SE9).

To the northeast, the Morses' (1983:104) projectile point sequence initiates with the "Early Corner-Notched Horizon," dated 7500–7000 B.C. Points diagnostic for this period in Northeast Arkansas include Kirk Cluster, St. Charles, and Thebes, as well as some possible side-notched forms (Hardaway Dalton and Big Sandy). The distribution of these types is weighted to the upper Cache River, and, overall, is quite similar to the Dalton pattern, suggesting continuing occupation of the same territories (Morse 1997).

To the southwest, in the Saline River Basin, Jeter and Early (1999:41) subdivide the Early Archaic into two discrete units: the Early Archaic (7500–6000 B.C.) and the Scottsbluff Intrusion (7000–6000 B.C.). Under this scheme, the "Early Archaic" is a catchall for all early Holocene material other than Dalton or San Patrice. Scottsbluff points are thought to "represent an intrusion from the Great Plains into western Arkansas" (Jeter and Early 1999:41). It has been suggested that Hardin derived from Scottsbluff (Justice 1987:51-53), as the two types show morphological intergradation. Scottsbluff type I and II points are part of the Cody complex, which has one of the widest spatial distributions in the southwest (Cordell 1984:135-138).

However, McNutt (1996:195) cautions that Hardin Barbed is not similar to Scottsbluff I. The Scottsbluff Intrusion is thought to be linked to the expansion of prairie environments at the onset of the hot, dry climatic interval known as the "Hypsithermal".

MIDDLE ARCHAIC PERIOD

Across the Southeast, the Middle Archaic was marked by a shift in subsistence modes. This was possibly due to environmental changes caused by the Hypsithermal, a climatic episode dated 7000–3000 B.C. by McNutt (1996) or 8000–4000 B.C. by Morse and Morse (1983). This change resulted in restricted deciduous forest occurrence, limiting the availability of certain floral and faunal resources. The cultural impact of this warming trend appears to have been most strongly felt from 5500–3500 B.C. Several settlement models regarding human adaptation during the climatic optimum have been posited. Some Middle Archaic populations in the Southeast appear to have congregated at a limited number of floodplain locations, because the drying of the uplands forced people into floodplains (Higgins 1990; Nance 1987). In contrast, Morse and Morse (1983) propose that the western lowlands of Northeast Arkansas were largely abandoned for the uplands (Ozark Plateau and its escarpment).

Big Creek culture is the dominant late Middle Archaic cultural manifestation in the study area. The "basis of this concept is the widespread distribution of double-notched or blade-notched Evans points" (Jeter and Early 1999:43). Jeter and Williams (1989) show the distribution of Evans points as a wide oval covering South Arkansas and North Louisiana. East-Central Arkansas is on the northern boundary of the core area of Big Creek culture. Pulaski County is on the northern boundary of this distribution, and at least one site in Little Rock (the Coleman Dairy Site (3PU46) has yielded Evans points. The chronological placement of Evans points as Middle Archaic was once questioned, but recent data from Northeast Louisiana reveals Evans points in association with Watson Brake Objects from contexts dated about 3300 B.C. (Saunders et al. 1994; Jeter and Early 1999:44).

To the east, the onset of the Middle Archaic period (6000–3000 B.C.) is typically recognized by the appearance of basally notched points, such as Eva, Marshall, and Calf Creek (House 1982b:SE9). To the southwest, in the Saline River Basin, there are few finds of this type, suggesting that the drainage was minimally occupied during the Hypsithermal peak (6000–4000 B.C.; Jeter and Early 1999:42).

LATE ARCHAIC PERIOD

The Late Archaic begins after the Hypsithermal as the modern climate and natural communities became established. Regionally, there is a dramatic proliferation in the number of sites, and thus the Morses (1983:115) dub this period the "Archaic Expansion", while McNutt (1996:199) favors Archaic "Resurgence" or "Renaissance". Characteristics include a substantial increase in the number of sites, cultural elaboration, and widespread trade. The Arkansas River was, by then, a well-entrenched meander belt-type fluvial system, and adapting to this environment was critical for human occupation. There is evidence of more sedentary lifeways and possibly limited horticulture being employed, as sunflower, squash, and other cultivated native starchy seed annuals appear in the archaeobotanical record at this time in other areas of the Southeast. Late Archaic settlement models typically have a seasonal round aspect, and there is evidence that the substantial "winter" villages, usually located on major streams, were actually occupied year round. Both earthen and shell mounds appear in the Southeastern archaeological record at this time. Knowledge regarding Late Archaic cultures in the study area, despite a significant number of sites, is currently slim due to limited research funds and a general focus of research on periods with more potential to reveal remains with unique characteristics (Morse and Morse 1996:125).

Late Archaic sites are well represented in Central Arkansas and are relatively common in nearly all settings, save for the Grand Prairie (House 1982b). In East-Central Arkansas, House

(1996:140) simply observes, "Later Archaic occupation is represented by highly varied notched and stemmed point forms." There is a significant increase in the use of novaculite during the Late Archaic. The Archaic chronology in the study area is largely based on extrapolation from adjacent culture areas, as no Late Archaic sites have been dated, and no stratified deposits have been excavated.

In Northeast Arkansas, the Morses (1983:118) suggest division of the Late Archaic into three subperiods, each named for a distinctive point type: Big Creek (3000–2000 B.C.), Burkett (2000–1000 B.C.), and Weems (1000–500 B.C.). Weems point usage continues into the Early Woodland, as does the related contracting-stemmed Gary point. In the Saline River Basin, Jeter and Early (1999:45) note that the Williams Point complex dates "mainly, if not completely, after 3000 B.C."

POVERTY POINT

Poverty Point, or Terminal Late Archaic, components are traditionally distinguished by the appearance of large mounds and other earthworks, clay balls or "Poverty Point Objects", microlithics, lapidary work, raw material trade, and specialized manufacturing sites. Poverty Point (1700–500 B.C.) is considered one of three cultural "zeniths" in prehistoric Southeastern studies. Midden mounds and gathering camps appear in the archaeological record at this time reflecting semi-sedentary populations (McNutt 1996; Morse and Morse 1983). In other portions of the Southeast, these components are referred to as Gulf Formational (Walthall 1990 [1980]) and include fiber-tempered ceramics as a diagnostic (see also Morse and Morse 1983:124).

During this period, the Poverty Point site in Northeast Louisiana was the center of a widespread exchange network. Raw materials from the Ouachita Mountains, west of the study area, such as novaculite, magnetite, hematite, and quartz crystals, were important commodities during this period. In the Saline River Basin, contracting-stemmed Gary points are described as "ubiquitous", and associated with Poverty Point culture.

Poverty Point objects and a number of presumably ceremonial or status related, non-utilitarian objects, have been recovered from sites in Northeast Arkansas (McNutt 1996:202). Poverty Point sites in Northeast Arkansas, however, lack evidence of many of the traits generally associated with this period found further south including microlithics, fiber-tempered pottery, human clay figurines, plummets, effigy beads, and other ground stone objects (Morse and Morse 1983:116).

EARLY WOODLAND

Intensification in horticultural methods, construction of earthworks, elaboration of artistic expression, and burial rituals are all thought to be related to a reorganization of social structure during the Woodland period (600 B.C.–A.D. 1000; Griffin 1967). For at least part of the year, a sedentary group was needed to perform horticultural activities. Sedentism and communal labor efforts promoted territorial circumscription. Archaeologically, hallmarks of this period are the introduction of ceramics and construction of burial mounds. Variability in ceramic technology is the primary consideration in interpreting settlement patterns and chronological progression during the Woodland period. Considerable archaeological attention has been focused on these ceramic cultures, and Woodland phases are proposed for the Arkansas River Lowland.

Early Woodland components in the Arkansas River Lowland are referred to as Tchula (Phillips et al. 1951). No Tchula sites have been excavated, nor have any Tchula phases been proposed in the study area (House 1996; Morse and Morse 1983; Phillips 1970). In Northeast Arkansas, Tchula diagnostics are rare, leading Morse and Morse (1996:126) to propose that the population was dispersed in hamlets and small villages. In the Saline River Basin, Jeter and Early (1999:48) discuss the Early Woodland under the rubric Early Fourche Maline period.

MIDDLE WOODLAND

The Middle Woodland period features elaborate burial ceremonialism and artistic expression, and represents the second major cultural "zenith" in the prehistoric Southeast. In the Ohio Valley the Middle Woodland period is referred to in terms of Hopewell, while in the Lower Mississippi Valley this period is characterized as Marksville. However, there is little evidence for true Marksville traits in the Little Rock area. Some of the numerous undifferentiated ceramic period scatters in this area may date to the Middle Woodland period. Downstream, Phillips (1970:889) assigns sites with Middle Woodland components along the Lower Arkansas to the Massey phase. In the Saline River basin, Jeter and Early (1999:48-49) place sites in this period into the Middle Fourche Maline (100 B.C.–A.D. 400) category.

LATE WOODLAND

During the Late Woodland period (A.D. 400–700) many of the traits associated with the Marksville Period disappear (Morse and Morse 1983:181) and pottery decoration is characterized as reaching a "low ebb" (Phillips 1970:901). In the Central Mississippi Valley this period is marked by two contrasting ceramic traditions, sand-tempered (Barnes) and clay/grog-tempered (Baytown). Baytown is an "overburdened" term due to a number of archaeological uses and definitions thereof, including: (1) the Late Woodland Baytown phase (Phillips 1970); (2) a ceramic tradition, or "Baytown culture" centered on the Baytown site (Phillips 1970:903); and (3) the Baytown period, a now-outdated major subdivision of the prehistoric sequence that subsumed the Marksville, Baytown, and Coles Creek periods of this sequence (Phillips et al. 1951).

Baytown ceramics characterize Late Woodland sites in the Arkansas River Lowland. The Ink Bayou Site (3PU252) contains a Late Woodland component that is dated A.D. 680 (Waddell et al. 1987). At this time the site was seasonally occupied, and used to process hickory nuts. Diagnostic artifacts associated with the Late Woodland component at Ink Bayou include Gary, *var. Malvern* projectile points/knives (PP/Ks), and ceramics such as Yates Net Impressed, Mulberry Creek Cord Marked, and Larto Red, *var. Mound Pound*. Other ceramic types are present as well, but cannot be distinguished from the later, more intensive Plum Bayou occupation.

COLES CREEK PERIOD (PLUM BAYOU CULTURE)

During the Coles Creek period, the dominant influence is Plum Bayou culture that flourished in the Arkansas River Lowland around the Toltec Mounds Site (3LN42), located on the banks of Mound Pond. Plum Bayou culture replaces Phillip's (1970) Toltec phase. The Toltec Mounds is a large (40 ha) site that includes 18 mounds arranged around two plazas, all surrounded by a D-shaped earthen embankment (Rolingson 1982). Mound construction at Toltec began ca. A.D. 700, and the site was abandoned prior to A.D. 1050 (Rolingson 2002:45-53).

Plum Bayou sites are best known within 25 km of Toltec (Rolingson 1998:113), but related sites, such as Alexander (3CN117), are found in the Arkansas River Valley to the northwest (Hemmings and House 1985). Four Plum Bayou site types have been defined by Nassaney (1992, 1996a, 1996b): single household, multiple household, multiple household with single mound, and multiple mound center.

The Ink Bayou site is one of the better-known sites (excluding Toltec) occupied during the florescence of Plum Bayou culture (A.D. 700–1000). Diagnostic lithic artifacts at Ink Bayou include Honey Creek PP/Ks, Rockwall, and Scallorn arrow points, Means Stemmed *vars. Means* and *Coy* darts (Waddell 1987). Diagnostic ceramics include Coles Creek Incised, *var. Keo* and Officer Punctated, *var. Willow Beach*. Other ceramics that are part of this component include Coles Creek Incised, *vars. Plum Bayou* and unspecified, Larto Red, *var. Mound Pound* and

unspecified, and Officer Punctated *vars. Snow Brake* and *Bearskin* (Waddell 1987). Analysis of faunal and floral samples reveals that the Plum Bayou culture inhabitants of the Ink Bayou Site had a diverse subsistence strategy that included both wild and cultivated plants, and a heavy reliance on deer meat for protein. One structure was recorded at the site; it was 6-×-4.5 m in size, and all human activity appears to have been focused around it.

Plum Bayou culture appears to have ended ca. A.D. 1000–1050. As a result, in East-Central Arkansas, House (1996:150-151) suggests that "after the end of Plum Bayou culture," regional abandonment is a "viable" interpretation.

MISSISSIPPIAN

Regionally, the Mississippian period marks a third climax of native cultural development; however, this is not really the case in the Arkansas River Lowlands, as Plum Bayou is the prehistoric cultural apex. Diagnostic Mississippian traits include shell-tempered ceramics, inter-regional exchange of exotic items, population nucleation on the floodplain, emphasis on corn agriculture, public architecture, the development of a distinctive elite iconography, and the rise of chiefdoms. In Northeast Arkansas, the sequence of Mississippian developments has been the topic of considerable research (Morse and Morse 1983, 1990). However, while Mississippian culture was developing in Northeast Arkansas during the Early Mississippian Big Lake phase (A.D. 700–1000), Coles Creek culture was climaxing near Little Rock.

There are a few scattered Mississippian sites in the Arkansas River Lowlands. For example the Ink Bayou Site contains a minor Late Mississippian component dated A.D. 1550 (Waddell 1987). It is speculated that this occupation only represents a temporary campsite.

PROTOHISTORIC

The Protohistoric period (1541–1686) marks the appearance of Europeans into Arkansas, opening with the Spanish de Soto expedition and closing with the establishment of Arkansas Post by the French. Stewart-Abernathy and Watkins (1982:12) consider this a period of indirect contact. The diagnostic trait of Protohistoric sites is the presence of low frequencies of European trade goods, such as iron and copper items and glass beads, in association with Late Mississippian artifact types.

Protohistoric components along the lower Arkansas River from Little Rock to Arkansas Post are distinguished by artifact assemblages referred to as the Menard Complex (House 1996). The focus has traditionally been on the Menard-Hodges locality near Arkansas Post, but two Menard complex components are located at the Little Rock Airport: Goldsmith Oliver 1 (3PU55) and Goldsmith Oliver 2 Site (3PU306; Jeter et al. 1990). Other key Protohistoric sites in the region include Noble Lake (3JE19) and Kuykendall Brake (House 1996:151), and Kinkead-Mainard (3PU2; Hoffman 1977). The Menard Complex at Noble Lake is characterized by Wallace Incised and similar broad-line incised treatments, and helmet or deep flaring rim cooking bowls (House 1996:150, 1997). Mortuary vessels include "teapots" and Caddo trade vessels. European trade goods include glass beads, and brass or copper objects. House (1996:152) suggests "that the Menard complex may broadly represent the long-sought occupation of the region during the lost century following the de Soto *entrada* and may not date—at least exclusively—to the era of earliest French contact and the founding of Arkansas Post."

Research at these sites is of significant importance to understanding the late Prehistoric-early Historic chronology of the region. Unfortunately, research regarding Protohistoric to early Colonial chronology has been hampered by the "Quapaw paradox" (Hoffman 1990), a reference to the problems in linking the Menard Complex (formerly referred to as the Quapaw phase, see below) assemblages to the historical Quapaw tribal movements. Hoffman (1990) proposed three hypothetical reasons for the paradox:

1. The Quapaw were immigrants to the Lower Arkansas River that adopted the material of the remaining Mississippian people.
2. The Historic Quapaw are a post-de Soto amalgamation of collapsed Siouan speaking Mississippian peoples (i.e., the Morse's 1983 model).
3. The Quapaw are archaeologically unknown, and what has previously though to be Quapaw represents Tunican speakers (i.e., the Jeter model).

HISTORIC SEQUENCE

COLONIAL PERIOD

Arkansas was part of Louisiana (New France) for most of the Colonial period (1673–1803). In 1756, the French and Indian War (Seven Years' War) broke out partly as a result of French efforts to fortify the Ohio Valley. Prior to France's defeat by the British and their allies in 1763, the French secretly ceded Louisiana to Spain by the Treaty of Fontainebleau in 1762. Louisiana was returned to France in 1800, but many Spanish officials still held local offices in 1803.

The early portion of the Colonial period (ca. 1660–1720) was a period of direct contact between Native Americans and Euro-Americans, and the late portion of the Colonial period (post ca. 1720) was a period of coexistence (Stewart-Abernathy and Watkins 1982:12). Diagnostic artifacts include French, English, and Spanish trade goods dating from the late seventeenth century to the late eighteenth century.

During the seventeenth century French expeditions played an important role in the exploration and future settlement in what is now Arkansas. The Jesuit Missionary Father Jacques Marquette and fur trader Louis Joliet were the first of a number of French explorers to visit East Arkansas. They encountered the *Arkansea* (interpreted as a Quapaw village) at the mouth of the Arkansas River in the summer of 1673 and then turned back for Canada. The next French explorer in Arkansas was La Salle, who in 1682 arrived at the mouth of the Arkansas River and subsequently explored approximately 30 mi. upstream of the latter river. Along the Arkansas River, La Salle and his party contacted the Quapaw Indian villages of Tongigua, Tourima, and Osotouy. Henri de Tonti established Arkansas Post near Osotouy in 1686 (Hanson and Moneyhon 1989:24).

The Frenchman Bernard de la Harpe is generally credited with discovering the geographically prominent location that became Little Rock in 1722 while exploring the Arkansas River (Herndon 1922:819). La Harpe named a stone outcrop where the city now lies *La Petite Roche* (Little Rock), and named another larger outcrop 2 mi. upstream on the opposite bank *La Grande Roche*. Late eighteenth-century and early nineteenth-century documents suggest the French also referred to Little Rock as *Petit Rocher* (Arnold 1991:18, 185; Dickinson 1989). Hunters and trappers are thought to have established squatter settlements in the Little Rock vicinity by the 1760s (Arnold 1991:185; Ross 2002).

There are few excavated Colonial period (1673–1803) sites in East-Central Arkansas. Excavations have been conducted at two of Arkansas Post's locations: the mid-eighteenth century Desha County location (McClurkan 1971), and the ca. 1779–1804 upstream *Ecores Rouges* location (Holder 1957). Holder (1957) identified the remains of the 1752 De La Houssaye fort and the Spanish Fort San Carlos III, built in 1780. Walthall (1991) analyzed the ceramics from Holder's excavations, and observed a temporal lag of 26.5 years between the mean ceramic dates and mean historic dates for the site, an indication of the post's isolation.

The mid- to late eighteenth century in America brought with it a period of social strife as increased activity and settlement by Europeans caused conflict between colonial powers

themselves and between the colonial powers and the indigenous populations. Control over the massive amount of natural resources present in the New World became a continual source of unrest.

During the 1790s, growing numbers of Anglo-Americans crossed the Mississippi River into Arkansas. The random and dispersed settlement pattern of the Americans contrasted with the clustered Colonial pattern (Foley 1989:82-83). Spanish governor Francisco Luis Héctor became more generous with land grants during this period. Most Spanish land grants in Arkansas were made in Arkansas County (n=68; Hanson and Moneyhon 1989:25). Spanish land grants were also made in Jefferson County (n=15), Pulaski County (n=4), and Prairie County (n=1).

QUAPAW

The most important Native American group along the lower Arkansas River, during the Colonial and Territorial periods was the Quapaw. The Quapaw, or O-gah-pah, are linguistically classified as Dhegiha Siouan, and are closely related to the several tribes that speak similar dialects: Osage, Omaha, Kansa, and Ponca (Sabo 1992:27). In many ways the Quapaw were typical Southeastern Indians, cultivating corn, beans, and squash, and participating in pan-Southeastern rituals such as the Green Corn ceremony and the calumet ceremony. Quapaw villages were composed of long, multi-family bark-covered houses that were arranged around a central plaza with a council house, an elevated platform or mound for high status individuals, and a sacred temple located nearby.

In 1673, when Marquette and Jolliet descended the Mississippi River in canoes, they visited the Quapaw village of Arkansea near the mouth of the Arkansas River. Jolliet's written records of the expedition were lost in a wreck (Hamilton 1970:219), but he produced a map in 1674 (Tucker 1942). On it, Quapaw and Koroa villages are shown on the Lower Arkansas River (Kidder 1988:4) and four "Akanka sauvage" villages are shown on the eastern bank in Mississippi.

In 1686, the establishment of Arkansas Post near the Quapaw village of Osotouy provided direct access to trade goods for the Quapaw. Before 1700, the Tongigua village on the eastern side of the Mississippi River moved across and settled with the Toriman "at the junction of the Akansas" (Swanton 1946:176). Bienville, reported their population in 1725 was 220 warriors (Swanton 1946:176). This was down from a total population estimate of approximately 2,500 in 1650.

In the late-seventeenth century, the Quapaw actively sought an alliance with the French, primarily to obtain firearms, so that they could combat the Chickasaw (who had been armed by British traders operating overland from Charlestown). Material evidence for this alliance can still be found at the *Museé de l'Homme* in Paris, where several beautifully painted buffalo hide that the Quapaw presented the Dauphine in early to mid-eighteenth century are found. One of these, the "Three Villages Robe" is interpreted as a map, with a trail connecting the three Quapaw villages to Arkansas Post, and leading to a battle with the Chickasaw (Horse Capture 1993:136-137). The importance of firearms to the Quapaw is illustrated by their inclusion on this painted buffalo robe. In 1750, Father Vivier estimated that the Quapaw population was 1,400 and included 400 warriors (Swanton 1946:176).

The Quapaw phase was proposed by Phillips (1970:943) and updated by Hoffman (1977). These sites are located on the lower Arkansas River. The ceramic assemblages are shell-tempered. Some distinctive ceramic vessel forms such as elaborately painted bottles, teapots, and helmet bowls are considered diagnostic, as are seventeenth century European trade goods. Because the strong archaeological evidence for continuity between very Late Mississippian phases in East Arkansas (i.e., Nodena, Parkin, Kent, Walls, and Old Town phases) and the Quapaw phase, the

Morses' (1983) suggest that that Quapaw phase represents an amalgamation of Northeast Arkansas refugees—who fled territories ravaged by de Soto's diseases—and became the historic Quapaw tribe. Ford (1961) considered his excavations at the Mernard Mounds as "conclusive" evidence of the link between the ethnohistorical Quapaw (in particular the Quapaw village of Osotouy) and the archaeological Quapaw phase, but this view is now challenged.

There is conflict between Quapaw oral tradition, linguistics, and the ethnological and archaeological data from Ford's excavations at Menard Hodges (Hoffman 1990:219). For example, Quapaw structures are particularly problematic, as historically they are described as long and bark-covered, similar to Algonkin houses; however, the only two "Quapaw" structures excavated at Menard-Hodges exhibit waddle and daub construction (Ford 1961; Hoffman 1991). House and McKelway (1982:SE41) refer to this problem as the "Quapaw Paradox". Most archaeologists now favor the term Menard-Hodges complex over the ethnically charged "Quapaw phase".

In 1997 the Wallace Bottom #2 Site (3AR179), which is near the Menard-Hodges Site, was discovered, and it produced a Colonial era assemblage that is consistent with it being the actual Quapaw village of Osotouy (House 2013). Wallace Bottom #2 produced a mixture of Native American artifacts and Euro-American artifacts that reveal it was occupied 1686–1749; it also lacks Menard Complex traits. Key Native American diagnostics at Wallace Bottom #2 include Mississippi Plain rims with distinctive lugs below the lip, Natchez trade pottery (Fatherland Incised) dated ca. 1714–1731, and an unusually high frequency of end scrapers. End scrapers were needed to process deer hides that the Quapaw used in trading, and the production of deer hides increased dramatically during the Colonial period in response to European trade relations. Euro-American diagnostics recovered from Wallace Bottom #2 included French faience, English delftware, Mexican majolica, Westerwald stoneware, glass beads, iron tools, wrought nails, cast iron kettle rims, musket balls, and European gunflints.

TERRITORIAL PERIOD

The Territorial period (1804–1836) falls within Stewart-Abernathy and Watkins' (1982) Pioneer Activity period (1780–1850) in the *State Plan*. The Colonial period ends with the Louisiana Purchase in 1803. Formal transfer of authority took place at Arkansas Post in 1804 (Arnold 1991). Arkansas was part of the Louisiana District from 1804–1805 and was part of the Louisiana Territory until 1812. From 1812–1819, Arkansas was part of the Missouri Territory. Arkansas County, one of the state's original two counties, was created on 13 December 1813.

In 1805, the three Quapaw villages were on the southern side of the Arkansas River approximately12 mi. above Arkansas Post (Swanton 1946:176). Also in 1805, the U.S. Government established a trading post (known as a "Factory") at Arkansas Post to trade with the Quapaw (McGimsey 1969:39). This post was closed in 1810.

In 1818, the Quapaw ceded most of their land claims south of the Arkansas River in exchange for a reservation, as well as $4,000 in merchandise and an annual payment of $1,000 in merchandise (Hanson and Moneyhon 1989:19). A Frenchman, Joseph Bonne, who served as an interpreter during the treaty negotiations settled at Pine Bluff shortly after the land was ceded (Herndon 1922:881). The naturalist Thomas Nuttall (1999[1821]) visited Pine Bluff during 1819 and reported seeing two or three families there, including Ambrose Bartholomew, a descendent of a French hunter.

On 2 March 1819, President James Monroe signed a bill creating "Arkansaw Territory", which included present-day Arkansas and Oklahoma (Hanson and Moneyhon 1989:28). Arkansas Post, located far downstream near the mouth of the Arkansas River, was the territorial capital until 1820 when the political center of gravity shifted west to Little Rock.

In 1824, Robert Crittenden negotiated a treaty with the Quapaw to give up the reservation created for them in 1818 in exchange for re-settlement among the Caddo in the southwestern part of the state (Hanson and Moneyhon 1989:19). The Caddo did not welcome them, and many Quapaw returned to their 1818 reservation. Another treaty in 1833 resulted in the Quapaw resettling in northeastern Indian Territory (Oklahoma).

Pine Bluff was selected as the Jefferson County seat in 1832, and a town was laid out (Herndon 1922:882). The town was incorporated in December 1842. By 1920, Pine Bluff had grown to be the third largest city in Arkansas (Table 3-01).

Table 3-01. Pine Bluff Population.*

Year	Population
1850	400
1860	1,396
1870	2,081
1880	3,203
1890	9,952
1900	11,496
1910	15,102
1920	19,280

*Data from Herndon (1922:882)

Excavated Territorial period sites in Central Arkansas are concentrated at Little Rock. The Ashley Site (3PU256) is defined as Block 33 of the original Little Rock plat, and was the site of the Ashley Mansion that was built during the 1820s and added onto in the 1850s. In 1984, the concrete slab floor from the warehouse was removed and an archaeological excavation of the mansion site was conducted by AAS with the assistance of many volunteers (Stewart-Abernathy 1984). Territorial and Antebellum period features identified include: a 1820s cellar; a 1850s cellar, living quarters with fireplace, floorboards, and two window wells; two areas of 1820s–1830s brick pavement; and over 100 m of wall lines. Across the street, the site of the 1823–1827 Cherry-Cumberland Street print shop of the Arkansas Gazette, which is located on the grounds of the Arkansas Territorial Restoration, has been excavated (Kwas and Guendling 1999). During the most recent work at the print shop, an 1823 retaining wall facing 2nd Street, its builder's trench, and the corners of the 1823 structure were unearthed. The AAS has also conducted several projects at the Old State House Site (3PU313), a public structure that was begun in 1833. Some relatively old diagnostics have been recovered from 3PU313, including one Rockingham glazed earthenware sherd, dated 1760–1790, and a piece of dark green, hand-blown bottle glass (Sabo 1988:2). More recently, a large pit that is interpreted as a ca. 1836 clay pit source for brick making was documented at the Old State House (Guendling 1997). Guendling (1994) also conducted excavations in the southern half of Block 98 of the original Little Rock plat in an effort to locate deposits associated with the ca. 1848 Roswell Beebe occupation. Beebe's mansion was a Greek Revival structure facing Markham Street that burned in 1865. Its outbuildings remained for some time afterwards, but no later than 1876, as, in that year the Old Pulaski County Courthouse was built there.

EARLY STATEHOOD (1836–1860)

With the removal of the Native Americans, Arkansas grew fairly rapidly in the 1830s and its population had tripled by the end of the decade. In 1836, Arkansas became the twenty-fifth state. The population was 52,240, of which 19 percent were black slaves (Hanson and Moneyhon 1989:38). During this era Little Rock grew from "an obscure village of 1820 … into the metropolis of the state" (Herndon 1922:845).

Steamboats provided the most reliable and cheapest transportation into and out of Little Rock during the Early Statehood or Antebellum period (1836–1860). Steamboats needed wood for fuel, and one of the principal occupations of early nineteenth-century settlers along the major rivers, such as the Arkansas, was selling wood to steamboats (Goodspeed 1889). The clearings these choppers generated became the first town and plantation sites. Plantation agriculture initially developed in East Arkansas along the Mississippi River, and then expanded up the Lower Arkansas River. As a result, the majority of the plantations, and associated slaves, in and near the study vicinity, were concentrated along the Arkansas River.

PUBLIC LAND SALES

The General Land Office (GLO) began surveying East Arkansas into townships in 1815, and this work continued up to the Civil War. The initial objective was to lie out 2 million acres for distribution to veterans of the War of 1812 (Hanson and Moneyhon 1989:26). The east/west base line was set at a point near the mouth of the St. Francis River, running due west to the Arkansas River. The Fifth Principal Meridian was used as a north/south line. Land sales based on this Township-Range system began in 1821. Today, the nineteenth-century GLO plat maps and field notes are used by archaeologists to both locate Historic features and to reconstruct environmental conditions.

The policy of surveying public land into six-mile square townships that were subdivided into 36 numbered sections of 640 ac. had been established by the Ordinance of 1785 (Fehrenbacher 1969:40). Initially, public land was sold in 640 ac. tracts (whole sections), but such tracts proved too large and too expensive—even at the Land Act of 1796 price of $2 an acre—for most frontiersmen. The Land Act of 1800, also known as the Harrison Land Act, authorized minimum purchases of 320 ac. and a four-year credit system (Johnson 1966:663). However, the credit system failed on account of the large number of overdue payments. This, coupled with the financial Panic of 1819, prompted Congress to abolish the credit system. The Land Act of 1820 reestablished the policy of selling land only for cash, and lowered the price to $1.25 per acre.

CIVIL WAR AND RECONSTRUCTION

Prior to the Civil War, Unionist sentiment was highest in the Northwest, while the southern and eastern counties, where cotton was produced with slave labor, not surprisingly favored secession. In the initial vote for secession during March 1861, Pulaski County delegates did not favor secession, but delegates from neighboring Arkansas, Jefferson, and Prairie counties favored secession (Hanson and Moneyhon 1989:41). After the war began in April, the convention reconvened and Arkansas voted for secession on 20 May 1861.

No strategically significant military engagements took place in Central Arkansas during the Civil War, but important action took place in the study area during the 40-day, 1863 Little Rock campaign (DeBlack 1994:90-95). After the Battle of Helena and the surrender of Vicksburg in July 1863, Confederate resistance west of the Mississippi River collapsed. Seizing the opportunity, the U.S. Major General Frederick Steele began a campaign to capture Little Rock. Little Rock was captured in September 1863, and remained an occupied city for the duration of the war.

Reconstruction lasted from 1865–1874 in Arkansas. Far more serious than the loss of life during the war were the effects of occupation. Both sides were responsible for burning crops, buildings, and industrial and manufacturing centers. It took more than 20 years to recover and rebuild from the effects of such destruction, and the scarcity of food and goods during the war had far-reaching, long-term effects on the economic and social fabric of society. In 1874, the "Brooks-Baxter War" between rival claimants to the governorship ended when President Grant intervened and ordered the Brooks forces to disperse (Herndon 1922). Later in 1874, Arkansas adopted a new constitution that restored the franchise to all whites and guaranteed full civil rights for blacks, and the state was readmitted to the Union.

TENANT PERIOD

The period from 1875–1950 is known as the Tenant period, named for the sharecropping or tenant farm labor system that was a significant characteristic of Southern U.S. agriculture after the Civil War. The decentralization of the former plantation system developed during the reconstruction period as a means of stabilizing labor relations between freedmen and landowners.

The importance of the Tenant Farm period in the archaeological record is that it probably represents the maximum occupation of the Eastern Lowlands prior to the recent development of non-farm rural settlement. Stewart-Abernathy and Watkins (1982:HA18) suggest that there are between 30,000 and 50,000 Tenant period sites in East Arkansas. The issue of these Rural Farmstead (i.e., Tenant) period sites' NRHP significance status has generated some commentary (Wilson 1990). Tenant settlement patterns can be clearly observed on 1930s-era quadrangle sheets and aerial photographs, with structures aligned along roads and bayous at regular spacings (100–400 m). The dispersed settlement pattern of the Tenant period contrasts sharply with the clustered settlement pattern prior to 1865 (Orser and Nekola 1985:68).

The archaeological characteristics of Tenant period sites include high frequencies of Kitchen Group artifacts (up to 85 percent), primarily bottle glass and ceramics, all dating from the late nineteenth century to the mid-twentieth century (Buchner 1992). The ceramics are typically cheaper types, often from mismatched sets, and many of these types can be identified following Price (1979). Mean ceramic dates are often not calculated for these sites due to the long span of whiteware production (1830–present), as well as problems relating to temporal lag. Omitting brick counts, the Architecture Group artifacts are generally about as frequent as Activity Group artifacts (approximately 5 percent each). Only trace frequencies of other artifact groups are found (Arms, Clothing, Personal, Biological), and in small assemblages, these minority group types are often not represented. The cultural material at Tenant period sites is typically from near-surface plowzone contexts as a result of the structures typically being elevated on brick, concrete, or cypress stump piers. Occasionally, Tenant sites are multi-component (i.e., co-occur with Prehistoric material); this is largely dependent on the natural setting of the site. However, note that many Tenant period sites are located on silty clay (backswamp/backslope) soils that were not suitable for human habitation until after drainage improvements were made.

RAILROAD PERIOD

One of the most important economic developments in Arkansas after the Civil War was the development of the state's rail system, and the city of Little Rock was at the hub of this system. During this era, referred to by Stewart-Abernathy and Watkins (1982:HA18-19) as the Railroad period (1855–1950), communication and transportation became dominated by the railroads. From an archaeological viewpoint the Railroad period is summarized as:

> … aside from the increased presence of consumer goods and increased general information level, the Railroad period is reflected by scores of nucleated settlements whose end or beginning date correspond to the coming of the railroad, and by some of the greatest landscape modifications

> made by people. These modifications take the form of embankments, cuttings, bridges, and support complexes, and exist on an intensive and extensive scale matched only by the construction after 1950 of highways and levees [Stewart-Abernathy and Watkins 1982:HA18-19].

The first railroad in Arkansas was the Memphis & Little Rock (M&LR), charted in 1853. By 1858 the track was complete from Hopefield (opposite Memphis) to the St. Francis River (Woolfolk 1967). By 1862 the western end of the M&LR line was in place from Little Rock to DeValls Bluff on the White River (Hanson and Moneyhon 1989:49). It was not until after the Civil War that the two sections were joined, under the supervision of former C.S.A. General Nathan B. Forrest. The first permanent bridge constructed over the Lower White River was at DeValls Bluff. With the completion of the DeValls Bluff Bridge in 1871, the M&LR was open as a continuous line from Hopefield to Little Rock (Moneyhon 1993:212).

Another important early railroad in Arkansas was the Cairo & Fulton (C&F). By 1874 the C&F—an extension of the St. Louis, Iron Mountain & Southern Railroad—had completed a line from Northeast Arkansas (Clay County) to Little Rock and southwest to Fulton on the Red River; trains were running from St. Louis to Texarkana (Hanson and Moneyhon 1989:49). The northeastern section of this line roughly parallels the escarpment of the Ozark Plateau and is still used by Amtrak's *Texas Eagle* today. Hanson and Moneyhon (1989:49) note that by the close of the 1870s, 822 mi. of track had been built in Arkansas.

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IV. LITERATURE AND RECORDS SEARCH

ARCHAEOLOGICAL SITES

An online review of the Automated Management of Archaeological Site Data in Arkansas (AMASDA) was conducted. Importantly, this research reveals that there are no previously recorded archaeological sites known within the Jefferson Labs campus.

Within a 2 km radius of the campus there are 14 previously recorded archaeological sites (Table 4-01). Bennett et al. (1993) initially recorded all but one of these sites during the 1990-1991 Pine Bluff Arsenal survey; see AMASDA project 1702 review below. Guendling and Mintz (1988) recorded 3JE265 in 1988 during the ARKLA rural expansion survey; see AMASDA project 1333 review below. Prehistoric components dominate (n=12), and there is one Historic site (3JE323) and one mixed Prehistoric/Historic site (3JE286). The majority of the Prehistoric sites are simple lithic scatters that likely represent the remains of briefly occupied hunting camps, and indeed two of the "sites" are isolated artifact finds. In contrast, Site 3JE285 represents a substantial Prehistoric habitation area, and House and Farmer's (2001) Phase II testing of the site revealed a significant Late Prehistoric/Protohistoric (possible Caddo) deposit with a minor Archaic component.

Table 4-01. Previously recorded archaeological sites within 2 km of the Jefferson Labs campus.

Site	Description
3JE265	Isolated chert cobble biface recovered from ditch on west side of NCTR access road; identified in 1988 during ARKLA rural expansion survey (Guendling and Mintz 1988)
3JE285	Eastwood Bayou: A 140-x-70 m Late Prehistoric/protohistoric (Caddo?) site with minor Archaic occupation; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993) and Phase II tested in 2000 (House and Farmer 2001)
3JE286	A 350-x-100 m undifferentiated Prehistoric and Historic site; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE320	Isolated Archaic/Woodland PP/K; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE321	Low-density 40-x-40 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE322	Low-density 40-x-40 m undifferentiated Prehistoric lithic scatter on dirt road; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE323	Low-density 50-x-50 m Historic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE324	Low-density 100-x-100 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE325	Low-density 50-x-50 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE326	Low-density 50-x-50 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE327	Low-density 50-x-50 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE328	Low-density 50-x-50 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE329	Low-density 50-x-50 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)
3JE331	Low-density 50-x-50 m undifferentiated Prehistoric lithic scatter; identified in 1991 during Pine Bluff Arsenal survey (Bennett et al. 1993)

PREVIOUS INVESTIGATIONS

Review of AMASDA project files reveals that a tiny portion (<1 ac.) of the Jefferson Lab campus was previously surveyed for archaeological resources during Guendling and Mintz's (1988) ARKLA rural expansion survey (see AMASDA 1333 review below). However, the bulk of the campus has not been previously surveyed for archaeological resources. Within a 2 km radius of the Jefferson Labs six archaeological projects are documented within the AMASDA database; they are review chronologically below.

Note that the architectural resources within the campus were surveyed and preliminarily evaluated in 2005 (Robinson & Associates, Inc. 2005); see "Jefferson Labs History" section following the "Cartographic Review."

PINE BLUFF ARSENAL TRACTS A & B SURVEY (AMASDA 829)

During March 1982, Archeological Assessments, Inc. (AAI) conducted a survey of two tracts (A and B) totaling 200 ac. at the Pine Bluff Arsenal (Bennett and Stewart-Abernathy 1982). Tract B was located roughly 0.5 mi. south of Jefferson Labs, at the headwaters of Phillips Creek. Both tracts were noted to contain a large number of pimple or prairie mound natural features. Bennett and Stewart-Abernathy (1982:10) "noted that almost all of the prairie mounds in the western half of Tract B were scared by old excavation activities" that were interpreted as "attempts to locate prehistoric remains in the mounds" (i.e., old looter pits). AAI's field methods included the excavation of an unspecified number of shovel tests at 20 to 30 m intervals. Negative findings were reported at Tracts A and B.

MCCLELLAN-KERR ARKANSAS RIVER NAVIGATION SYSTEM STUDY (AMASDA 1313)

In 1989, Archeological Assessments, Inc. conducted a reconnaissance-level cultural resources and geomorphological investigation of the McClellan-Kerr Arkansas River Navigation System for the U.S. Army Corps of Engineers (USACE), Little Rock District (Bennett et al. 1989). The purpose of this work was to provide a description of the landscape concerning archaeological sites to aid in the planning and testing of future Cultural Resources Management (CRM) actions in the area.

Bennett et al. (1989) conducted geomorphic and archaeological field investigations at five reaches: Petite Jean (Pools 8 and 9); Maumelle River; Fourche Bayou; Plum Bayou; and Bayou Meto. The Plum Bayou Reach, which extends from Brodie Bend cutoff (RM 92) to Pine Bluff, is the nearest to the Jefferson Labs campus. Survey Unit 10 sampled an Arkansas River point bar covered in natural levee deposits in this reach. This resulted in the identification one Euro-American site (3JE262) (Bennett et al. 1989:47).

ARKLA RURAL EXPANSION SURVEY (AMASDA 1333)

During May 1988, the AAS conducted a survey of a 5.6 km long natural gas pipeline corridor that extended from the NCTR complex north to Love Creek (Guendling and Mintz 1988). Construction of the pipeline had been halted after 4.1 km was complete due to failures in the permitting process. The portion of the pipeline that was on and/or near the Jefferson Labs campus (i.e., the NCTR facility) was already competed, and was visually surveyed (Guendling and Mintz 1988:Figure 1). This resulted in the identification of an isolated Prehistoric novaculite biface (3JE265; see table 4-01) a short distance north of the Jefferson Labs campus.

The 1.5 km long section of proposed (i.e., not yet built) pipeline followed existing high-voltage transmission lines, and was surveyed via staggering shovel tests at 20 m intervals. This resulted in the identification of a low-density Prehistoric lithic scatter near Love Creek (3JE264). No further work was recommended at either of these low-density sites.

PINE BLUFF ARSENAL INVENTORY (AMASDA 1702)

During 1990-1991, AAI conducted a survey of the Pine Bluff Arsenal (PBA) in association with the preparation of a Cultural Resources Inventory for the instillation (Bennett et al. 1993). Bennett et al. (1993:1) notes the PBA originally covered >15,000 ac., but that in 1972 about 500 ac. was transferred for the establishment of the NCTR; thus the PBA now consists of 14,944 ac.

The initial stage of the study focused on identifying approximately 10,000 ac. at PBA that had not been disturbed by construction of PBA facilities, and developing a probability model to guide the survey. The model relied largely on geomorphic setting and soil types. Intensive fieldwork—including tightly spaced pedestrian and shovel test transects—was then conducted at seven specific physiographic settings (survey units), and additionally there was a directed Historic survey that utilized archival sources. The nearest survey unit to the Jefferson Labs was designated "Upper Eastwood Bayou." All 13 of Bennett et al.'s (1993) sites listed in Table 4-01 were identified within this survey unit.

Overall, the PBA inventory survey resulted in the identification of 46 archaeological sites that were grouped into four broad property types: (1) small Prehistoric lithic scatters; (2) small Prehistoric lithic and ceramic scatters; (3) large nineteenth to mid twentieth century historic scatters; and (4) smaller historic scatters representing abandoned family farms. Bennett et al. (1993) titled their volume *The Humanly-Altered Landscape*, and concluded that the Prehistoric record of this area was sparse, and that the more numerous historic sites were principally associated with ca. 1880-1941 farms.

PHASE II TESTING OF SEVEN SITES (AMASDA 4263)

During 2000, the AAS conducted Phase II testing at seven of the 46 archeological sites identified by Bennett et al. (1993) during the PBA inventory survey (House and Farmer 2001). They included two Prehistoric sites (3JE285 and 3JE290) and five Historic sites (3JE307, 3JE310, 3JE312 (loci A, B and C), 3JE314 and 3JE317. One of these sites, Eastwood Bayou (3JE285), is located on a dissected terrace remnant overlooking Eastwood Bayou approximately 1 km northeast of the Jefferson Labs campus.

Work conducted at the Eastwood Bayou included the excavation of 107 shovel tests and two 1-x-2 m test units (House and Farmer 2001:7). The site produced 300 ceramic sherds and abundant chipped stone debris. The ceramics and three C14 dates suggest an occupation dating from AD 1200-1450. Low frequencies of decorated types, such as Foster Trailed Incised, suggest contact with Caddo population in the Ouachita River basin, and the principal archaeological component at the site was considered late Prehistoric, possibly Caddo, but affinities to the Menard Complex in the Arkansas River lowland were also apparent (House and Farmer 2001:12-16).

Importantly, House and Farmer (2001) suggested that Prehistoric Native American burials were likely present in the house or mound sampled by Unit 2. As a result, the Eastwood Bayou site 3JE285 was recommended as eligible for the NRHP, and it was further suggested that the site warranted consideration as a sacred Native American site.

PINE BLUFF BIOPLEX RECORDS REVIEW (AMASDA 4931)

During 2003, Historic Preservation Associates (HPA) conducted a records review for the Pine Bluff Bioplex (Klinger et al. 2003). Other than a drive by reconnaissance, no archaeological fieldwork took place in association with this study.

ARKANSAS HISTORIC PRESERVATION PROGRAM STRUCTURE FILES

The AHPP GIS viewer was reviewed on line with respect to this undertaking. There are no previously recorded historic properties within the Jefferson Labs campus.

Within other portions of Section 17 of T4S R10W, which contains the Jefferson Labs campus, there are three previously recorded properties; they are plain traditional structures that recorded in 2015: JE0137 (Building 93-232); JE1038 (Building 93-132); and JE1039 (Building 96-621). JE1037 is considered Eligible for the NRHP, while JE1038 and JE1039 are considered not eligible for the NRHP.

NATIONAL REGISTER OF HISTORIC PLACES LISTINGS

As of this writing, there are 72 NRHP-listed properties and nine de-listed properties in Jefferson County, Arkansas (National Register of Historic Places 2019). A wide variety of property types are represented, including dozens of buildings or structures, two historic districts, two cemeteries, nine railroad related properties, three roads, two monuments, one field, and one sign. There are no listed archaeological sites within the county.

Within the PBA there is one listed property, the Pine Bluff Arsenal Access Road Bridge No. 2280. Listed in January 2019, this bridge on Highway 256 and spans Caney Creek. It is approximately 7 km south of the Jefferson Labs campus.

The nearest NRHP listed property to the Jefferson Labs campus is a segment of Dollarway Road (NRHP #74000480 and #99000822), which is roughly 6 km to the northwest. The road was listed in 1974 and contained most of what is now Highway 365. A boundary increase in 1999 included portions to the south of the former listing, and what is now Reynolds Road (this is the portion that is nearest to the Jefferson Labs).

Dollarway Road is significant for representing Arkansas's early twentieth-century efforts at constructing roads for automobiles (Stager 2013). Construction began in November 1913, and was completed by October 1914. The road was named because it was though that it cost $1 per ft., but the actual cost was $1.36 per foot. The road was 23 mi. long and 9 ft. wide, and made of concrete with a bituminous coating. Four reinforced concrete bridges were part of the design.

CARTOGRAPHIC REVIEW

1825 PLAT MAP

The earliest detailed map of the future Jefferson Labs campus is the 1825 General Land Office (GLO) plat map for T4S R10W (Figure 4-01). No cultural features are shown on this plat, the entire township is essentially a wilderness. The most prominent feature on this plat is the Arkansas River, and a hatched area labeled "swamp" is found between the future lab campus and the river. Unlabeled drainages that we interpret as Eastwood Bayou and Philips Creek are indicated north and south of the future Jefferson Labs tract.

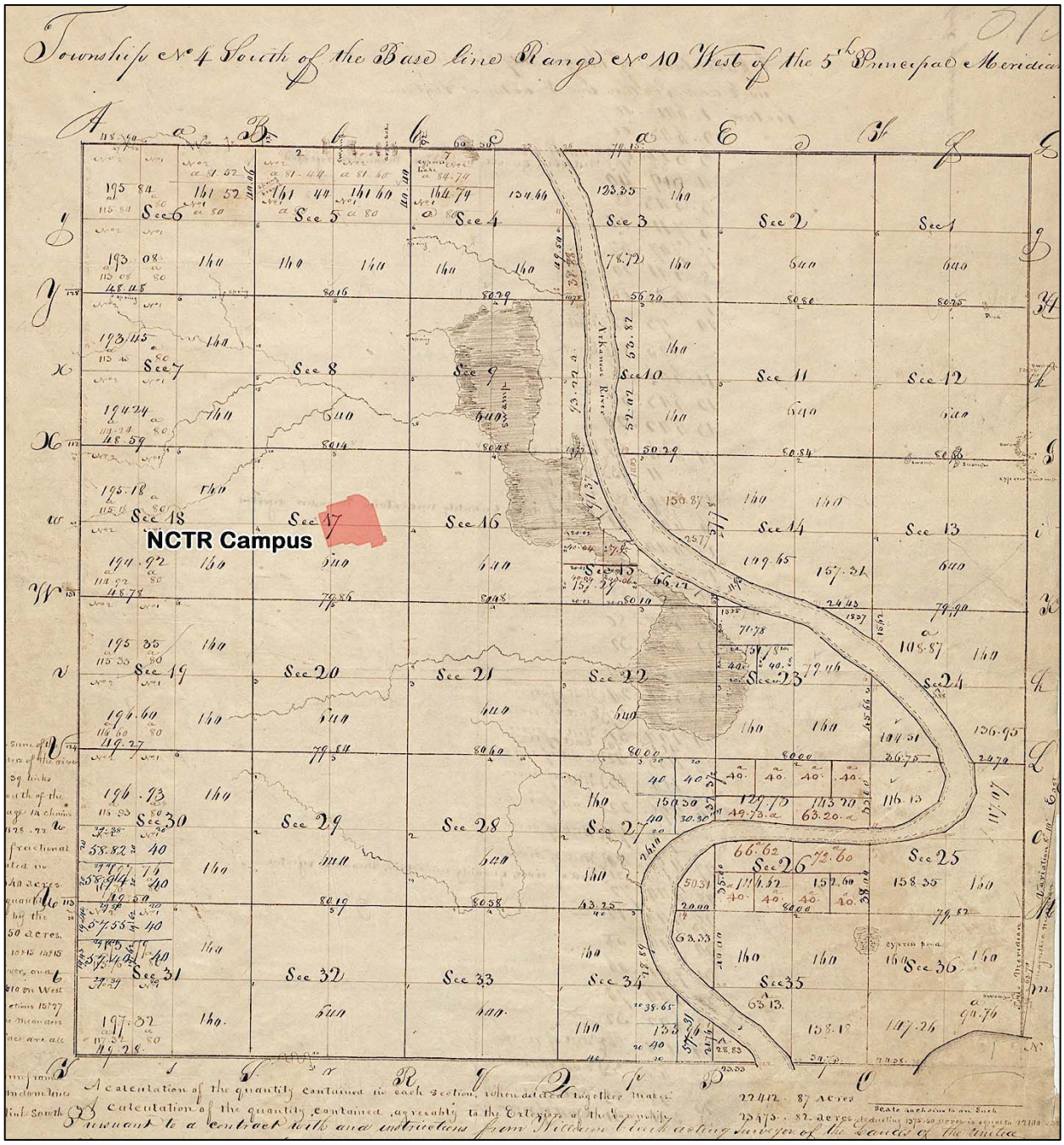

Figure 4-01. The 1825 T4S R10W plat map with the future Jefferson Labs campus highlighted (map obtained from the BLM website (http://www.glorecords.blm.gov).

1932 QUADRANGLE MAP

A century later, the 1932 Pastoria, AR 15-min. quad reveals that the future Jefferson Labs campus remained undeveloped and forested. This map also reveals the heavily dissected terrace edge topography overlooking the Arkansas River to the east of the future campus. Much of the surrounding area, except for a corridor along the Missouri Pacific Railroad to the west, also remained sparsely populated and forested. An unimproved road passed through the southern portion of the future Jefferson Labs campus in 1932. A 1935 edition of the Pastoria, AR 15-min. quad is also available, but shows the same details in the study area as the 1932 edition.

Figure 4-02. A portion of the 1932 Pastoria, AR 15-min. quad with the future Jefferson Labs campus overlain.

JEFFERSON LABS HISTORY

The following history of the Jefferson Labs is based on a review of Robinson & Associates, Inc.'s (2005) historic preservation report, Nolte et al. (2002) and Bearden (2014).

The FDA's Jefferson Labs is housed in a complex of buildings that were original constructed in 1951-1952 as a U.S. Army biological weapons research and production facility at the PBA. Plans for the construction of the facility developed as the U.S. military's biological and chemical weapons strategies evolved during the early days of the Cold War. After years of a "retaliation only" policy, in 1950 an *Ad Hoc* Committee on Chemical and Biological Warfare recommended policy changes that allowed for expanded research and field tests on biological agents, as well as the establishment of a large-scale biological munitions production facility. At about the same time the Korean War broke out, and as a result the Secretary of Defense approved the construction of a biological agent production facility at the PBA; the X201 plant. PBA was selected, in part, because it had been manufacturing chemical weapons for the U.S. Army since 1941.

The site chosen was an undeveloped area at the northern end of the sprawling PBA instillation, and construction began in February 1951 with site clearing and grading (Figure 4-03). The Chemical Plants Division of Blaw-Knox Construction Company designed and built the X201 plant for $79 million (Nolte et al. 2002:3-26). The 1951 drainage plans show that an extensive system of ditches with check dams and culverts was required; thus the natural landscape was extensively modified (Figure 4-04).

Figure 4-03. February 1951 photos showing ground breaking at the NCTR facility (photo courtesy: Greg Tapp; Jefferson Labs).

The new facility was designed as a campus of 30 buildings arranged in a loose orthogonal plan, with roads and rail access (see Figure 4-04). Because the biological agents produced at the facility were light sensitive, the buildings were designed to be self-contained, secure, and airtight for the safety of workers and the environment. The structures were constructed in a purely functional style, lacking any architectural ornamentation, using concrete and steel, and were covered in buff-colored ceramic tile.

The biological agents were produced in Building 50, a seven-story tall windowless structure in the center of the complex that dominated the built landscape of the facility (Figure 4-05). In this building scientists wearing protective suits and goggles produced the biological agents in various laboratories. Four interconnected buildings (5A, 5B, 5C and 5D) to southwest of Building 50 were an assembly line where the agents were prepared for being inserted into munitions (i.e., aerial bombs, artillery shells, etc.). In Building 85A the explosives were added to the munitions, and for this reason this building had a blast hatch. Most of the other buildings served support or storage roles, such as: employee showers (Building 53), laundry (Building 15), boiler plant (Building 7), fuel tank farm (Building 8), water treatment facility (Building 11), cooling tower (Building 20), guard shack (Building 21), and telephone office (Building 28).

Agent production began in December 1953 and the scientists researched large-scale fermentation, concentration, storage, and microorganism weaponization. Seven biologically produced toxins were produced, with the deadliest being *anthrax bacilius*. The facility was part of the Directorate of Biological Operations (DBO), which was classified and secret, and as a result their records are not well-represented within PBA archives (Nolte et al. 2002:3-28).

Biological weapons development continued at the facility until November 1969 when President Nixon banned offensive biological and chemical research for ethical and practical reasons. Nixon's policy shift resulted in the closing of the PBA facility, and its transfer to the FDA.

In 1971, the FDA was part of the Department of Health, Education and Welfare (HEW). In January 1971 the National Center for Toxicological Research (NCTR) was established at the former PBA biological weapons facility, after a HEW commission stressed the scientific imperative of research into the effects of toxic chemicals on humans and the environment. On May 1, 1972 ownership of the facility and 496 ac. were transferred from the Army (PBA) to HEW (FDA) (Nolte et al. 2002: 3-31).

The NCTR had a more scientific mission, and with an influx of Federal funding, the older facilities were cleaned up and renovated, a process that continues to date. Initially, Building 50 and Buildings 5A—5D were gutted and renovated for NCTR labs. Several other buildings were modified during the 1970 for use as animal laboratories (Buildings 6, 5A, 14B, 14B, 52 and 53), which included the development of a barrier system. However some structures continued in the same function: the cafeteria (Building 12) and the administration building (Building 13).

In the early 1980s new facilities were established to research carcinogens and toxicity. As a result the second floor of Building 53 was renovated for animal laboratories, and a new animal quarantine was added to Building 14. Later in the 1980s, new buildings were added to study low-calorie diets. In the mid 1990s the NCTR site shared the name of Arkansas Regional laboratory (ARL). By the late 1990s, the NCTR gained the ARL as a part of the FDA field lab consolidation program.

In 1995, a 16,000 ft.^{2} Library Conference Facility (Building 10) was constructed at the former location of a building of unknown function to north of Building 26. A new quarantine (Building 62A) was constructed on the north side of Building 62 in 1996. About the same time, the U.S. Army funded additional campus clean up efforts, including the removal of all the old piping and storage tanks used by the PBA.

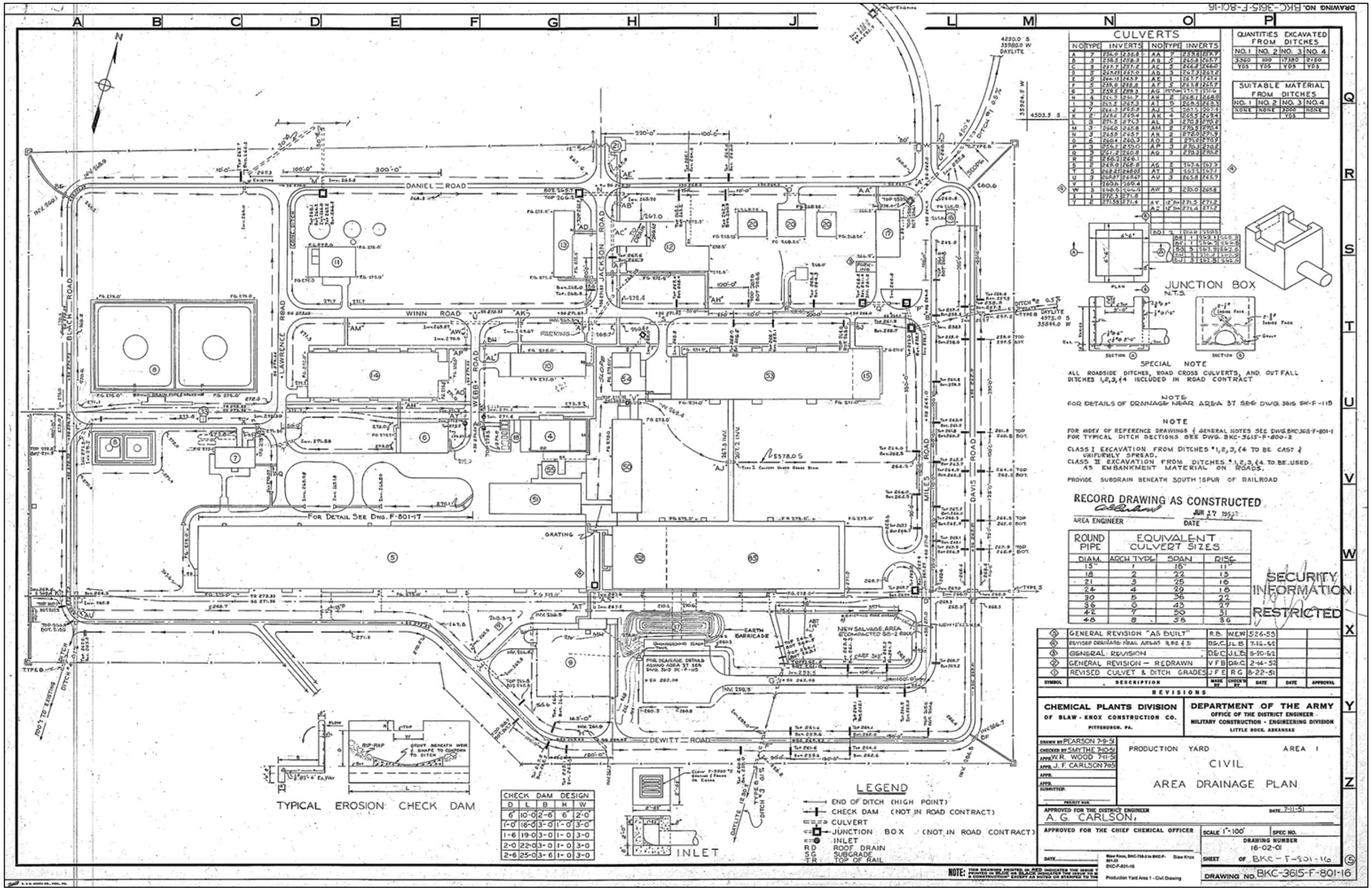

Figure 4-04. The 1951 drainage plans for biological agent production facility X201 at PBA (photo courtesy: Greg Tapp; Jefferson Labs).

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Figure 4-05. Early 1980s aerial photo of the Jefferson Labs campus, view to the south (photo courtesy: Greg Tapp; Jefferson Labs).

In 2003, plans for the "Decommission and Restoration of Closed Laboratories" led to the construction of a new 177,000 ft.^{2} structure, Building 26, located due west of Building 50 for the ARL. This required the demolition of the three small buildings. As apart of this project the monolithic and imposing Building 50 was stripped and gutted. Once windowless, the renovated structure now exhibits plate glass windows and a decorative brick veneer exterior (see Figure 5-31).

NRHP ELIGIBILITY ASSESSMENT

Robinson & Associates, Inc. (2005:26-27) conducted a preliminary NRHP eligibility assessment for the FDA's Jefferson Laboratories and concluded the following:

> Although the U.S. Army's Pine Bluff Arsenal represents a critical period during the United States' military history and is thus determined to have been [a] highly significant site, many of the character-defining features of the complex have been extensively altered since the FDA's acquisition in 1971/1972 and its subsequent alterations to the existing buildings. (This includes the extensive renovation of Building 50). Numerous changes to the site over the past 30 years have resulted in a significant loss on integrity, which makes judging the site a complicated process.

> It is the tentative finding of this Preliminary National Register Assessment that the FDA-Jefferson Laboratories is not judged to be eligible for listing as a National Register historic district due to the significant degree of integrity loss. This is due to the fact that several building that were instrumental to the Pine Bluff Arsenal's biological production activities on the site have been renovated and reconstructed to the degree that integrity has been lost for the majority of the original buildings. Most of the original ca. 1952 building shells remain intact, but the complex network of laboratories that operated during the 1953-1969 era have been gutted and rebuilt for the FDA's use. One of the more significant examples of this loss is seen in Building 50, which was virtually demolished to its bare steel structure and has been reconstructed from the inside out, with an entirely new exterior structure and façade (completed 2005). Examples of major interior renovation can be seen in Building 5 (A, B, C, D) and Building 53 (A, B, C, D, E), which have largely been gutted and reconfigured to support the FDA's animal laboratories. As a result, key components of the Pine Bluff Arsenal are lost from the site.
>
> Since the FDA's arrival in 1972, the construction of new buildings and landscape features on the site has resulted in loss of integrity to the site as a whole. The most significant new addition to the historic landscape is Building 26, a large 177,867-square-foot building completed in 2003 located at the center of the campus. The new construction included a new pedestrian pathway and sheltering canopy extending between Buildings 26, 50, and 51. An additional example is found in the virtual reconstruction of Building 10 in 1995, transforming in from a ca. 1952 machine room into a library and conference center.
>
> As a result of this demolition, the FDA-Jefferson Laboratories property has become a fragmented collection of old and new buildings, and therefore is not judged to meet National Register Criteria A of the National Register of Historic Places as a historic district.

However, Robinson & Associates, Inc. (2005:27) also noted that it is possible that some the remaining elements of the biological production line may be considered individually eligible under Criteria A for their "association with events that have made a significant contribution to the broad patterns of our history." Building 52 and the line of structures created by Buildings 5A—D and Buildings 85A—C are cited a possible examples, as is the bunker (Building 37) (Table 4-02).

Table 4-02. Individual building NRHP assessments (after Robinson & Associates, Inc. 2005).

Building	Date	NRHP Assessment
000 Grounds	1952	Not eligible
00W Power Pole	n/a	Not eligible
5A, B, C and D Assembly line where biological agents were placed in munitions	ca. 1952	Potentially eligible
6	1952	Not eligible
7 Boiler plant	1952	Not eligible
8 Tank Farm	1952	Not eligible
9	1952	Not eligible
10 Machinery room	1952/1995	Not eligible
11 Water treatment	1952	Not eligible
12 Cafeteria	1952	Not eligible
13 Administration	1952/1985 Addition	Not eligible
14A	1952	Not eligible
14B	1952	Not eligible
14C	1952	Not eligible
15 Employee laundry	1952	Not eligible
16	1952	Not eligible

Building	Date	NRHP Assessment
17	1952	Not eligible
20 Cooling tower	1952	Not eligible
21 Guard shack	1952	Not eligible
22 Clarifier	1988	Not eligible
26A	2003	Not eligible
26B	2003	Not eligible
28	1952	Not eligible
31 Communications and Copy Center	1952	Not eligible
32	1952	Not eligible
37 Earth covered bunker	ca. 1952	Potentially eligible
44	1973	Not eligible
45	1987	Not eligible
46	1985	Not eligible
48	2000	Not eligible
50 Biological agents labs	1952/2005	Not eligible
51	1952	Not eligible
52 Assembly line where explosives were placed in munitions	ca. 1952	Potentially eligible
53A-E Employee showers	1952	Not eligible
54	1952	Not eligible
58	n/a	Not eligible
60	1962	Not eligible
62	1952/2005	Not eligible
62A	1996	Not eligible
70	n/a	Not eligible
71A, B	1989	Not eligible
72A, B	1989	Not eligible
74A, B	1989	Not eligible
75A, B	1989	Not eligible
85A, B, and C Assembly line where explosives were placed in munitions	ca. 1952	Potentially eligible
HM1 Portable Haz-Mat	n/a	Not eligible
HM2 Portable Haz-Mat	n/a	Not eligible
P01 Portable	n/a	Not eligible
P19 Portable	n/a	Not eligible
T05 Trailer	n/a	Not eligible
T14Trailer	n/a	Not eligible
T45 Trailer	n/a	Not eligible
W14 Well	n/a	Not eligible
W15 Well	n/a	Not eligible
W16 Well	n/a	Not eligible
Solar Collectors	1981	Not eligible

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V. FIELD INVESTIGATIONS

METHODS

A two-person crew consisting of a Field Director and one Archaeological Technician conducted the fieldwork at the Jefferson Labs campus on February 12 and 13, 2019. Tommy Baioni escorted the crew during the survey, and Greg Tapp provided some archival materials. The basic archaeological method consisted of excavating shovel tests at 20 m intervals within undeveloped and relatively undisturbed locations with the campus. The existing buildings with the campus were also photo documented as a part of the survey.

STANDARD SHOVEL TEST

A shovel test consisted of the excavation of a four-sided hole at least 30 cm to a side (0.09 m^2). Each shovel test was excavated to culturally sterile deposits, unless a disturbance or water seepage halted the excavation. To ensure consistent artifact recovery, all sediment was hand-screened through 0.25-in. mesh hardware cloth. All natural and cultural strata revealed in the individual shovel test profiles were recorded using metric depth measurements, and described in terms of textural class and color (using the Munsell Soil Color Chart). Additional strata descriptions were provided as needed, such as moisture, natural rock content, and number and size of roots. Panamerican employs a specialized shovel test form to insure consistent shovel test profile recording. Following recording a shovel test, artifact sample bags (if any) were labeled. All holes were subsequently backfilled as closely as possible to the original condition.

SURVEY DOCUMENTATION

To ensure appropriate field data management, Panamerican employs a system the company developed for intensive surveys that has been successfully implemented for several years. Throughout the course of the fieldwork, the crew used specialized forms to individually record the shovel test locations. The status of each shovel test was assessed as positive (■), negative (❑), or not excavated (Ø). In the case of the latter, which are referred to as "no-test" locations, the reason for not excavating a shovel test is provided on the forms. This allows for a complete inventory of shovel tests to be generated. Shovel test profiles, sediment characteristics, and depths of artifact recovery, if any, were recorded on the forms during the fieldwork. At the end of each field day, this information is collected by the field director and reviewed for content. The shovel test data was later entered into a Microsoft Excel spreadsheet by Panamerican laboratory staff, and a table presenting the information was produced (see Table 5-01). This table documents the intensity of the survey, and demonstrates the coverage of the non-site areas within survey tracts.

In addition to the individual shovel test results recorded by the archaeological technicians, the field documentation included, but was not limited to, the following: (1) the Field Director maintained a set of field notes that outlines daily activities and provides a general commentary on the project findings, and it also includes any unique or significant findings; (2) the location of each identified cultural resource was recorded on project maps; (3) the survey area and all recorded sites were recorded using photography; and (4) a number of logs or lists were maintained, including ones for artifact bags and photo records.

ARCHAEOLOGICAL RESULTS

The archaeological survey of the Jefferson Labs campus produced negative findings; no artifacts or cultural deposits were identified. Due to the highly developed nature of the campus, relatively undisturbed locations suitable for shovel testing were restricted to two areas: (1) a ring around the campus perimeter between the fence and the outer access road loop—originally composed of Daniel Road, Blach Road, Dewitt Road and Davis Road (see Figure 4-04)—and (2) an open space between Buildings 11 and 13 where a pavilion is currently located and the new data center is planned. East of the large employee parking lot, in the northeast corner of the campus, the old baseball field was extensively disturbed, including a recent sewer line excavation, and offered fair to good surface visibility, thus it was visually examined; it was partly gravel covered and had been used as a laydown yard.

During the course of the survey 68 shovel test locations were documented (Table 5-01). All 68 were sterile, there were no positive shovel tests. The shovel tests were distributed as follows. Shovel test 1 was placed west of the entry road at the Guard Shack (Building 21), and shovel tests 2 through 20 were placed at 20 m intervals to the west to the corner of the campus (Figure 5-01). Shovel tests 21 through 28 were placed along the western perimeter fence, but two low wet areas were skipped over and not tested (Figure 5-02). Shovel tests 29 through 35 covered the area between the southwestern corner of the campus and the solar panels (Figure 5-03). Shovel tests 36 through 43 covered the portion of the southern perimeter between the solar panels and Buildings 44 and 45 and the lagoon (Figure 5-04). Shovel tests 44 through 55 covered the eastern perimeter, but one low wet area was skipped over there. Shovel tests 56 through 63 covered the northern perimeter from the northeastern corner back to the Guard Shack (Building 21) (Figure 5-05). Six shovel tests (A through F) were placed within the open area between Buildings 11 and 13 where the new data center is proposed (Figure 5-06).

The shovel tests ranged in depth from 6 to 34 cm, and the average depth was 25.34 cm (± 6.10 cm). Most of the shovel tests revealed a relatively thin surface horizon underlain by a heavily mottled silty clay or clay subsoil, with a sharp break between the two strata (Figure 5-07). Some of the tests were noted as being quite wet or saturated, and 14 of the tests exhibited significant quantities of gravel in the subsoil. In general, the tests are typical of a heavily disturbed depositional setting, a finding that is not surprising given the leveling and grading that Chemical Plants Division of Blaw-Knox Construction Company conducted during the ground work for the facility in 1951 (see Figure 4-03), coupled with the later construction activities, placement of a complex drainage system, and removal of old pipes.

Mr. Baioni explained several of the more disturbed areas. The large pile of dirt in the northwest corner of the campus (north of the above ground storage tanks) is fill material is derived from the excavation of the Building 26 basement; an ARL structure completed in 2003 (Figure 5-08). One of the two former railroads connecting the facility with the PBA is apparent in the southwestern corner of the campus; this line ran to the four interconnected Buildings (5A-D) that contained the assembly line for placing the biological agents into the munitions (Figure 5-09). The open area to north of this rail line and south of the above ground storage tanks, was used a lay down yard during the Building 26 construction and was highly disturbed (Figure 5-10).

Outside of the fenced area of the campus, the former baseball field had been used as a laydown area and was partly covered in gravel (Figure 5-11). West of the parking lot there is a inverted "U" concrete pond of uncertain function (Figure 5-12).

To conclude, the Jefferson Labs campus is an extensively developed and highly disturbed setting, and the negative archaeological finds are not surprising.

Table 5-01. Shovel test results.

Shovel Test	Result	Max Depth (cmbs)	Soil Description	Notes
1	❑	24	0-12 cm 10YR 4/6 silty clay loam; 12-18 cm 10YR 6/6 silty clay; 18-24 cm mottled 10YR 7/2 and 10YR 5/6 silty clay	
2	❑	30	0-8 cm 10YR 4/6 clay; 8-12 cm 10YR 6/6 silty clay; 12-24 cm 10YR 7/2 silty clay gravel; 24-30 cm 10YR 6/6 clay with sand	
3	❑	24	0-18 cm 10YR 4/6 silty clay loam; 18-24 cm 10YR 6/6 silty clay	
4	❑	30	0-10 cm 10YR 4/6 silty clay loam; 10-18 cm 10YR 7/2 silty clay; 18-30 cm 10YR 7/2 clay with grey sand	
5	❑	30	0-8 cm 10YR 4/6 silty clay loam; 10-18 cm 10YR 4/6 clay with sand; 20-30 cm 10YR 4/6 sandy clay	8-30 cm charcoal
6	❑	30	0-12 cm 10YR 4/6 silty clay loam; 12-20 cm 10YR 4/6 sandy clay with compact red rocks; 20-30 cm 10YR 6/6 sandy clay	
7	❑	30	0-12 cm 10YR 4/6 silty clay loam; 12-24 cm 10YR 6/6 sandy clay; 24-30 cm 10YR 4/6 sandy clay	
8	❑	30	0-10 cm 10YR 4/6 silty clay loam; 10-30 cm 10YR 7/2 compacted clay with sand	
9	❑	28	0-12 cm 10YR 4/4 silty clay loam; 12-28 cm mottled 10YR 6/6 and 10YR 7/2 silty clay	gravel
10	❑	26	0-10 cm 10YR 4/2 silty clay loam; 10-26 cm mottled 10YR 6/4 and 10YR 7/2 silty clay	gravel
11	❑	16	0-8 cm 10YR 3/3 silty clay; 8-16 cm 10YR 6/3 clay	gravel
12	❑	24	0-16 cm mottled 7.5YR 5/6 and 7.5YR 4/2 clay; 16-24 cm 10YR 6/4 clay	disturbed
13	❑	30	0-8 cm 10YR 4/4 silty clay loam; 8-30 cm 10YR 6/4 silty clay	
14	❑	18	0-4 cm 10YR 4/4 silty clay loam; 4-10 cm 10YR 4/6 silty clay loam; 10-18 cm 10YR 6/4 silty clay	
15	❑	24	0-8 cm 10YR 4/6 silty clay; 8-24 cm mottled 10YR 7/3 and 10YR 6/8 silty clay	
16	❑	21	0-8 cm 10YR 4/4 silty clay loam; 8-21 cm mottled 10YR 6/4 and 10YR 6/8 silty clay	
17	❑	10	0-10 cm 10YR 4/4 silty clay loam; 10-30 cm mottled 10YR 6/6 and 10YR 7/8 silty clay	large gravels
18	❑	26	0-8 cm 10YR 4/6 silty clay loam; 8-12 cm 10YR 6/2 silty clay; 12-26 cm 10YR 6/6 sandy clay	
19	❑	28	0-12 cm 10YR 4/6 silty clay loam; 12-28 cm 10YR 7/4 silty clay loam	
20	❑	28	0-8 cm 10YR 4/6 silty clay loam; 8-18 cm 10YR 6/6 silty clay; 18-28 cm 10YR 7/2 sandy clay with grey inclusions	
21	❑	6	0-6 cm 10YR 6/6 silty clay	very compact; near possible guard shack
22	❑	26	0-8 cm 10YR 4/6 silty clay loam; 8-18 cm 10YR 7/2 silty clay; 18-26 cm 10YR 6/6 sandy clay	

Shovel Test	Result	Max Depth (cmbs)	Soil Description	Notes
23	❑	20	0-4 cm 10YR 4/6 clay; 4-20 cm mottled 10YR 6/4 and 10YR 7/8 clay	very wet
24	❑	24	0-10 cm 10YR 4/6 silty clay loam; 10-18 cm 10YR 4/6 compacted clay; 18-24 cm 10YR 7/2 sandy clay	
25	❑	28	0-10 cm 10YR 4/4 clay; 10-28 cm 10YR 5/6 clay	
26	❑	24	0-12 cm 10YR 4/6 silty clay loam; 12-24 cm 10YR 6/6 compacted clay	
27	❑	31	0-12 10YR 4/3 clay loam; 12-31 cm 10YR 6/4 clay	
28	❑	18	0-10 cm 10YR 4/6 clay loam; 10-18 cm 10YR 6/6 silty clay	
29	❑	28	0-10 cm 10YR 4/4 clay; 10-28 cm 10YR 6/4 clay	
30	❑	20	0-10 cm 10YR 4/6 clay loam; 10-20 cm 10YR 7/2 compacted sandy clay	
31	❑	28	0-8 cm 10YR 4/4 clay; 8-28 cm 10YR 6/4 clay	wet
32	❑	18	0-8 cm 10YR 4/6 clay loam; 8-18 cm 10YR 7/2 compacted clay	gravel
33	❑	31	0-10 cm 10YR 4/4 clay; 10-31 cm mottled 10YR 6/4 and 10YR 7/8 clay	
34	❑	20	0-8 cm 10YR 4/6 clay loam; 8-20 cm 10YR 7/2 compacted clay	
35	❑	30	0-12 cm 10YR 4/4 clay; 12-30 cm mottled 10YR 6/4 and 10YR 7/8 clay	
36	❑	24	0-8 cm 10YR 4/4 clay loam; 8-16 cm 10YR 7/2 compacted clay; 16-24 cm 10YR 6/6 sandy clay	
37	❑	34	0-34 cm mottled 10YR 5/4 and 10YR 6/8 clay	
38	❑	26	0-10 cm 10YR 4/4 clay loam; 10-18 cm 10YR 7/2 compacted loam; 18-26 cm 10YR 7/2 sandy clay with manganese	wet manganese
39	❑	27	0-27 cm mottled 10YR 6/3 and 10YR 5/6 clay	wet; water at 25 cm
40	❑	26	0-8 cm 10YR 4/6 compacted loam; 8-14 cm 10YR 4/6 compacted clay; 14-26 cm 10YR 7/2 sandy clay	
41	❑	10	0-10 cm 10YR 3/3 clay loam	gravel below surface; wet
42	❑	30	0-10 cm 10YR 7/2 compacted clay loam; 10-20 cm 10YR 7/4 compacted clay loam; 20-30 cm 10YR 6/4 compacted clay loam	
43	❑	25	0-25 cm 10YR 7/4 clay	
44	❑	24	0-8 cm 10YR 4/6 compacted loam; 8-14 cm 10YR 6/6 sandy clay; 14-24 cm 10YR 7/2 compacted sand	wet
45	❑	24	0-24 cm mottled 10YR 6/4 and 10YR 5/8 clay	some gravels
46	❑	26	0-8 cm 10YR compacted clay loam; 8-20 cm 10YR 7/2 compacted clay; 20-26 cm 10YR 4/6 clay	wet
47	❑	30	0-30 cm mottled 10YR 4/3 and 10YR 6/4 clay	
48	❑	18	0-8 cm 10YR 4/6 compacted clay loam; 8-18 cm 10YR 4/6 sandy clay	compacted and wet
49	❑	30	0-8 cm 10YR 4/4 clay; 8-30 cm 10YR 6/6 clay	
51	❑	26	0-4 cm 10YR 4/4 clay; 4-26 cm 10YR 6/6 clay	wet
52	❑	24	0-8 cm 10YR 4/6 sandy clay loam; 8-18 cm 10YR 4/6 sandy clay; 18-24 cm 10YR 7/2 compacted sandy clay	

Shovel Test	Result	Max Depth (cmbs)	Soil Description	Notes
53	❑	34	0-18 cm 10YR 4/4 clay loam; 18-34 cm 10YR 6/6 clay	
54	❑	18	0-6 cm 10YR 4/6 compacted clay loam; 6-18 cm 10YR 7/2 compacted clay	
55	❑	30	0-30 cm mottled 10YR 4/4 and 10YR 5/8 clay	
56	❑	24	0-10 cm 10YR 4/6 sandy clay loam; 10-18 cm 10YR 6/6 sandy clay; 18-24 cm 10YR 7/2 compacted clay	
57	❑	6	0-6 cm 10YR 3/3 silty clay loam	compact; gravel at 6cm; near conduit
58	❑	28	0-8 cm 10YR 4/6 compacted clay loam; 8-20 cm 10YR 4/6 sandy clay; 20-28 cm 10YR 7/2 clay	
59	❑	29	0-18 cm 10YR 4/6 silty clay loam; 18-29 cm mottled 10YR 4/6 and 10YR 5/8 sandy clay	very compacted
60	❑	24	0-8 cm 10YR 4/6 compacted clay loam; 8-18 cm 10YR 4/6 sandy clay; 18-24 cm 10YR 7/2 clay	
61	❑	32	0-25 cm 10YR 4/6 silty clay; 25-32 cm mottled 10YR 4/6 and 10YR 6/4 silty clay	gravel at 32 cm
62	❑	24	0-5 cm 10YR 4/6 clay loam; 5-12 cm 10YR 7/2 compacted clay; 12-24 cm 10YR 7/2 saturated clay	wet manganese
63	❑	32	0-25 cm 10YR4/6 silty clay; 25-32 cm mottled 10YR 4/6 and 10YR 6/4 silty clay	gravel at 32 cm
A	❑	30	0-16 cm 10YR 6/4 clay; 16-30 cm mottled 10YR 6/4 and 10YR 5/8 clay	gravel
B	❑	34	0-15 cm 10YR 6/4 clay; 15-34 cm mottled 10YR 6.4 and 10YR 5/8 clay	some gravel
C	❑	28	0-15 cm 10YR 6/4 clay; 15-28 cm mottled 10YR 6/4 and 10YR 5/8 clay	some gravel
D	❑	30	0-12 cm 10YR 6/4 clay; 12-30 cm mottled 10YR 6/4 and 10YR 5/8 clay	some gravel
E	❑	31	0-16 cm 10YR 6/4 clay; 16-31 cm mottled 10YR 6/4 and 10YR 5/8 clay	some gravel
F	❑	26	0-14 cm 10YR 6/4 clay; 14-26 cm mottled 10YR 6/4 and 10YR 5/8 clay	

Figure 5-01. View west from entrance road at Building 21 toward northwest corner of campus; Shovel Tests 1-20 (DSCN1552).

Figure 5-02. View north from the southwest corner of campus; Shovel Tests 21-28 on left (DSCN1596).

Figure 5-03. View east to solar panels; Shovel Test 35 (DSCN1597).

Figure 5-04. View east from solar panels to southeast corner of campus; Shovel Tests 36-43 (DSCN1598).

Figure 5-05. View west from the northeast corner of campus; Shovel Tests 56-63 (DSCN1605).

Figure 5-06. Open area where data center is proposed; Shovel Tests A-F (DCSN1612).

Figure 5-07. Shovel Test A soil profile (DSCN1613).

Figure 5-08. Dirt pile in the northwest corner of the campus (DSCN1616).

Figure 5-09. Old railroad grade leading to Building 5A, view east (IMG_2272).

Figure 5-10. Laydown yard north of old railroad grade leading, view northeast (IMG_2271).

Figure 5-11. Outside perimeter, former baseball field, view east-northeast (DSCN1619).

Figure 5-12. Outside perimeter, concrete pond, view northwest (DSCN1623).

STANDING STRUCTURES

As discussed in Chapter IV, Robinson & Associates, Inc. (2005:26-27) conducted a preliminary NRHP eligibility assessment for the FDA's Jefferson Laboratories, and in a well-reasoned argument determined that the property is not eligible for the NRHP as a historic district (see this report pages 37-38). However, Robinson & Associates, Inc. (2005:27) also noted that it is possible that some the remaining elements of the biological production line may be considered individually eligible under Criteria A for their "association with events that have made a significant contribution to the broad patterns of our history." Table 4-02 summarizes their assessments of the structures at the FDA's Jefferson Labs on a building-by-building basis.

POTENTIALLY ELIGIBLE STRUCTURES

The only structures that were considered "potentially eligible" by Robinson & Associates, Inc. (2005:26-27) were the line of structures created by Buildings 5A, B, C and D, and the line of structures created Buildings 52 and 85A, B and C (see Table 4-02).

Significantly, Buildings 5A-D will remain as is (i.e., not be razed), thus the undertaking will not impact this potential historic property. Building 5A will remain an animal facility and Buildings 5B, C and D will be repurposed into consolidated archives and receiving/storage facilities (see Figure 1-04). Originally these four interconnected buildings housed an assembly line where the biological agents were prepared for being inserted into munitions (i.e., aerial bombs, artillery shells, etc.). During the 1970s, the FDA gutted and extensively renovated the interiors of these structures for NCTR labs. The exteriors of these structures were also altered; note the metal roofs with transom windows (Figures 5-13 and 5-14).

Buildings 52 and 85A, B and C are slated for demolition, and the location will be converted to green space within a significantly modified campus plan (see Figures 1-03 to 1-04). Thus the proposed undertaking will have an effect on this potential historic property. During 1952-1969 these buildings housed the end of the bomb assembly line, and it was here that explosives were added to the munitions containing the biological agents. In a footnote, Robinson & Associates, Inc. (2005:15) also report that Building 85A was later used as storage for an 800-bed hospital facility at Fort Chaffee, Arkansas.

Today, exterior of the Buildings 52 and 85A, B and C complex appears largely unchanged from the original unadorned and purely functional, windowless Cold War-era military/industrial design (Figures 5-15 and 5-16). The exterior of Structures 85A, B and C is concrete. The interior of these structures contained a "blast hatch" or empty space designed to absorb accidental explosions, and the walls were 2 ft. thick to further contain blasts (Robinson & Associates, Inc. (2005:14-15). The exterior of Structure 52 is brick, and a modern covered walkway has been added to the west side of it, as some type of HVAC unit (Figure 5-17).

Building 37 is an earth-covered bunker at the south end of campus where the completed munitions were stored until shipment. It is slated for demolition, thus the proposed undertaking will have an effect on this potential historic property. The bunker (Building 37) was connected to Building 85C via a tunnel. Munitions were likely temporarily stored in Building 37 after manufacture, then shipped to igloos (bunkers) on PBA for longer-term storage. Nolte et al. (2002:3-30) indicate that in 1953, as biological weapons production began, 47 igloos were built southwest of the biological production facility (i.e., Jefferson Labs) on the PBA.

Today, the Building 37 exterior (south façade) is a concrete loading dock with bay doors, and the north side of the structure is an earthen mound (Figure 5-18).

Figure 5-13. Building 5A south and west façades, view northeast (DSCN1573).

Figure 5-14. Buildings 5C and 5D south façade, view northeast (DSCN1574).

Figure 5-15. Building 85A east façade, view west; renovated Building 50 in distance (IMG_2277).

Figure 5-16. Buildings 85C, 85B and 85A south façade, view northeast (DSCN1577).

Figure 5-17. Building 52 south and west façades, view northeast (DSCN1576).

Figure 5-18. Building 37 (Bunker) south façade, view northwest with Buildings 85B-C in the background (DSCN1578).

NOT ELIGIBLE STRUCTURES

Importantly, Robinson & Associates, Inc. (2005) considered the other standing structures within the campus, including the majority of the structures that are slated for demolition as a part of this undertaking, as not eligible for the NRHP (see Figure 1-03 and Table 4-02). Photos of the not eligible structures slated for demolition are offered below (Figures 5-19 through 5-30).

Among the not eligible properties is Building 50, the seven-story tall laboratory where the biological agents were produced, and arguably the most significant single structure within the original Cold War facility. This building was stripped and gutted in 2005, and the formerly windowless structure now exhibits plate glass windows and a decorative brick veneer exterior (Figure 5-31).

Figure 5-19. Building 6 south and west façades, view northeast (DSCN1568).

Figure 5-20. Building 13 (Administration) west façade, view northeast (DSCN1556).

Figure 5-21. Building 16 north and west facades, view southeast (DSCN1560).

Figure 5-22. Building 17 north and east facades, view southwest (DSCN1559).

Figure 5-23. Building 20 (Cooling tower) west and south façade, view northeast; associated towers to the left and right have already been removed (DSCN1558).

Figure 5-24. Building 31 (Communications and Copy Center) north and west façade, view southeast (DSCN1555).

Figure 5-25. Building 46 south façade, view north (IMG_2278).

Figure 5-26. Building 51 east façade, view southwest (DSCN1590).

Figure 5-27. Building 53A-E complex (Showers) north façade, view southeast (DSCN1562)

Figure 5-28. Building 60 west façade, view east (DSCN1569).

Figure 5-29. Building 62, north façade, view southeast (DSCN1583).

Figure 5-30. Storage tanks, view northwest (DSCN1571).

Figure 5-31. Extensively renovated Building 50 west façade, view southeast (DSCN1588).

VI. SUMMARY AND RECOMMENDATIONS

SUMMARY

At the request of Pollution Management, Inc., Panamerican performed a Phase I cultural resources survey for the FDA's Jefferson Labs campus development project in Jefferson County, Arkansas. The purpose of this study was to create an inventory of all cultural resources present within the campus, and to provide appropriate management recommendations for their treatment.

The FDA's Jefferson Lab and the National Center for Toxicological Research (NCTR) are housed in a complex of buildings that were originally constructed during 1951-1952 for the U.S. Army's biological weapons research and production facility at the Pine Bluff Arsenal (Nolte et al. 2002:3-26; Robinson & Associates, Inc. 2005:11). The proposed undertaking will consist of the demolition of several aging structures (Buildings 6, 13, 16, 17, 20, 31, 37, 15/53, 46, 51, 60, 62, and 52/85), and the construction of several new buildings and the upgrade of the existing infrastructure within the approximately 100 ac. (40.5 ha) Jefferson Labs campus (see Figures 1-01, 1-02, 1-03 and 1-04).

An online review of the Automated Management of Archaeological Site Data in Arkansas (AMASDA) was conducted. Importantly, this research reveals that there are no previously recorded archaeological sites known within the Jefferson Labs campus. Within a 2 km radius of the campus there are 14 previously recorded archaeological sites (see Table 4-01); most are simple lithic scatters that likely represent the remains of briefly occupied hunting camps and were identified during the 1990-1991 Pine Bluff Arsenal survey (Bennett et al. 1993). Thus, the most likely type of Native American site to potentially be identified within the campus was expected to be a low-density lithic scatter.

Prior to the 1951 construction of the biological weapons facility, the future campus location was historically an undeveloped forested tract near the dissected terrace overlooking the Arkansas River, so no Historic period archaeological sites were expected (see Figures 4-01 and 4-02). Blaw-Knox Construction Company designed and built the facility early in the Cold War, and the natural landscape was extensively modified during the construction (see Figure 4-03). The facility was originally designed as a campus of 30 buildings arranged in a loose orthogonal plan (see Figure 4-04). Biological weapons development and production continued at the facility until November 1969 when President Nixon banned offensive biological and chemical research. In January 1971 the NCTR was established at the facility, and in 1972 ownership of it was transferred to the FDA. Over the last 47 years the FDA has extensively modernized and renovated most of the original campus structures, and well as razing some, in addition to constructing new buildings and infrastructure as their research mission developed.

Importantly, Robinson & Associates, Inc. (2005:26-27) conducted a preliminary NRHP eligibility assessment for the FDA's Jefferson Laboratories, and in a well-reasoned argument concluded the FDA Jefferson Labs property is a fragmented collection of old and new buildings, and therefore is not eligible for NRHP as a historic district. However, Robinson & Associates, Inc. (2005:27) also noted that three remaining elements of the original facility are potentially significant eligible under Criteria A for their "association with events that have made a significant contribution to the broad patterns of our history"; they include Building 37 (Bunker); the linear assembly Buildings 5A, 5B, 5C and 5D, and the linear assembly Buildings 52, 85A, 85B and 85C (Figure 6-01).

A two-person crew consisting of a Field Director and one Archaeological Technician conducted the fieldwork at the Jefferson Labs campus on February 12 and 13, 2019. Tommy Baioni escorted the crew during the survey, and Greg Tapp provided some archival materials. The basic

archaeological method consisted of excavating shovel tests at 20 m intervals within undeveloped and relatively undisturbed locations with the campus. The existing buildings with the campus were also photo documented as a part of the survey.

The archaeological survey of the Jefferson Labs campus produced negative findings; no artifacts or cultural deposits were identified. Due to the highly developed nature of the campus, relatively undisturbed locations suitable for shovel testing were limited. During the course of the survey 68 shovel test locations were documented (see Table 5-01). All 68 were sterile, there were no positive shovel tests. In general, the tests are typical of a heavily disturbed depositional setting, a finding that is not surprising given the leveling and grading during the ground work for the facility in 1951, coupled with the later construction activities, placement of a complex drainage system, and removal of old pipes. To summarize, the Jefferson Labs campus is an extensively developed and highly disturbed setting, and the negative archaeological finds are not surprising.

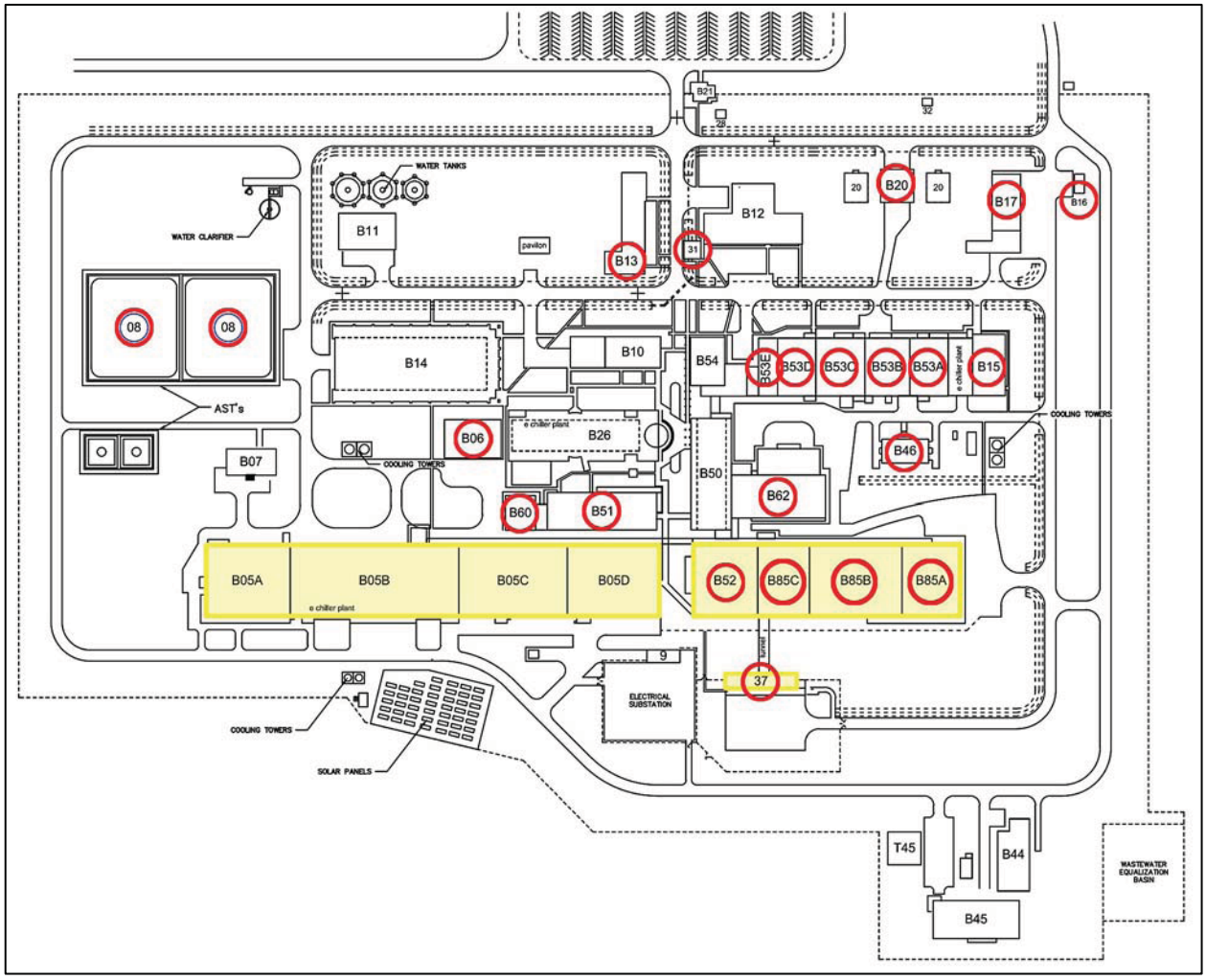

Figure 6-01. Plan view of the existing NCTR campus (map courtesy: PMI). Structures slated for removal are circled in red; potentially eligible buildings are highlighted in yellow.

Aboveground resources within the campus include at least 22 structures (going by building number counts) that are slated for demolition/razing as a part of the proposed undertaking (see Figures 1-03 and 1-04). Importantly, Robinson & Associates, Inc. (2005) considered most of the standing structures within the campus, including the majority of the structures that are slated for demolition as a part of this undertaking, as not eligible for the NRHP. Panamerican concurs with these earlier not eligible recommendations (see Table 4-02).

However, there are two elements of the original 1951 facility slated for demolition that Robinson & Associates, Inc. (2005) considered potentially eligible—or are of unknown NRHP status in our parlance—the biological munitions bunker (Building 37) and a linear structural complex (Buildings 52, 85A, 85B and 85C) that represents part of the ordinance assembly line. The exteriors of both of these properties appear unmodified and in more-or-less original condition (see Figures 5-15, 5-16, 5-17 and 5-18), and these two properties were once linked by a tunnel. Additionally, the unique blast hatch inside Building 85 was reportedly still intact in 2005 (Robinson & Associates, Inc. 2005:27). As a result, Panamerican concurs that these two properties are likely eligible under Criteria A for their association with the U.S. Army's Cold War biological weapons program.

Note that a third property that Robinson & Associates, Inc. (2005) assessed as potentially eligible, the linear structural complex formed by Buildings 5A, 5B, 5C and 5D, will remain as is (i.e., not be razed), thus the undertaking will not impact this potential historic property.

RECOMMENDATIONS

As there are no archaeological resources within the Jefferson Labs campus, and no additional archaeological investigations are recommended.

The two potentially NRHP eligible aboveground properties within the campus that are slated for demolition require an additional assessment. It is recommended that the AHPP be consulted regarding the level of documentation necessary to mitigate the adverse effect of the proposed demolition.

A third potentially NRHP eligible aboveground property within the campus will not be impacted under the current design plans. If these plans change, then additional architectural documentation could be required here as well.

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APPENDIX A: BIOGRAPHIES OF KEY PERSONNEL

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C. ANDREW BUCHNER, PRINCIPAL INVESTIGATOR

C. Andrew Buchner has 29 years experience as a cultural resource management (CRM) archeologist, is an owner/partner in Panamerican Consultants, Inc., and currently manages the company's Memphis office. His degrees include an M.A. (1989) in Anthropology from the Memphis State University, and a B.A. (1984) in Anthropology/Sociology from Westminster College, Fulton, Missouri. A native Arkansan (Little Rock Catholic High Class of 1980), he is certified by the Register of Professional Archeologists (RPA ID# 12420), and is a member of various professional organizations including the Society for American Archeology, the Southeastern Archeological Conference, the Caddo Conference, the Society for Historical Archeology, and the Society for Industrial Archeology. Additionally, he is a Life Member of the Arkansas Archeological Society. "Drew" has participated in dozens of projects in rural and urban contexts within Arkansas for clients including ARDOT, the U.S. Army Corps of Engineers, the National Park Service, the Ouachita National Forest, Arkansas Parks, and Arkansas Game & Fish Commission, as well as various engineering firms. Mr. Buchner has written over 700 technical reports, including at least 246 reports in the AMASDA database, and is published in various peer-reviewed journals including two monographs in the Arkansas Archeological Survey's Research Series: *Mississippian Transitions at John's Lake* (Research Series No. 60) and *Excavations at the Howe Pottery: A Late Nineteenth-Century Kiln in Benton, Arkansas* (Research Series No. 66).

ANDREW SAATKAMP, FIELD DIRECTOR

Andrew Saatkamp has 24 years of experience as a CRM archaeologist. His degrees include an M.A. (1994) in Anthropology from the University of Memphis and a B.A. (1989) in Anthropology from the University of Tennessee, Knoxville. Mr. Saatkamp is certified by the Register of Professional Archaeologists (RPA ID# 15459), and he is a member the Society for American Archaeology. Since joining Panamerican in 1994, Mr. Saatkamp has served as a Field Director for numerous survey projects in the southeastern United States, including numerous Phase I cultural resources projects in Arkansas. During his career, Mr. Saatkamp has authored or co-authored more than 275 contract reports, including at least 71 reports in the AMASDA database. Mr. Saatkamp possesses various ancillary and computer skills, including GIS manipulation and analysis.

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APPENDIX B: STATE HISTORIC PRESERVATION OFFICE CORRESPONDENCE

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THE DEPARTMENT OF ARKANSAS
HERITAGE

Asa Hutchinson
Governor

Stacy Hurst
Director

Arkansas Arts Council
•
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Delta Cultural Center
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Historic Arkansas Museum
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Mosaic Templars Cultural Center
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Old State House Museum

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e-mail:
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website:
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RECEIVED
SEP 26 2018
POLLUTION MGMT, INC

September 24, 2018

Ms. Hope N. Sharp
PMI
3512 S. Shackleford Road
Little Rock, AR 72205

RE: Jefferson County – Jefferson
Section 106 Review – USDA-RUS
Proposed Undertaking: Construction of New Buildings and Upgrade of Infrastructure within the Jefferson labs Campus
AHPP Tracking Number: 102261

Dear Ms. Sharp:

This letter is in response to your inquiry regarding properties of archeological, historical, or architectural significance in the area of the proposed referenced project. The staff of the Arkansas Historic Preservation Program has reviewed records pertaining to the area in question.

There are no recorded cultural resources located within this undertaking. However, due to the lack of documented archaeological or historical work and or research conducted in the vicinity of the undertaking, we recommend that a cultural resources survey be conducted in the areas of potential effect (APE).

Tribes that have expressed an interest in the area include the Caddo Nation (Ms. Tamara Francis), the Cherokee Nation (Ms. Elizabeth Toombs), the Chickasaw Nation (Ms. Karen Brunso), the Choctaw Nation of Oklahoma (Dr. Ian Thompson), the Jena Band of Choctaw Indians (Ms. Alina J. Shively), the Muscogee (Creek) Nation (Ms. Corain Lowe-Zepeda), the Osage Nation (Dr. Andrea Hunter), the Quapaw Nation of Oklahoma (Mr. Everett Bandy), and the Shawnee Tribe of Oklahoma (Ms. Tonya Tipton). We recommend that they be consulted in accordance with 36 CFR § 800.2 (c) (2).

Thank you for the opportunity to review this undertaking. Please refer to the AHPP Tracking Number listed above in all correspondence. If you have any questions, please call Tim Dodson of my staff at 501-324-9784.

Sincerely,

Scott Kaufman
Director, AHPP

cc: Dr. Ann Early, Arkansas Archeological Survey

td:tr

THE DEPARTMENT OF ARKANSAS HERITAGE

Asa Hutchinson
Governor

Stacy Hurst
Director

Arkansas Arts Council

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April 4, 2019

Mr. Gregory Tapp
Facilities Director
FDA – Jefferson Labs, Arkansas
Office of the Commissioner, Office of Operations, OFEMS
NCTR-50 RM 504 HFA-242
3900 NCTR Road
Jefferson, AR 72079

RE: Jefferson County — Jefferson
Section 106 Review — FDA
Draft Report – *Cultural Resources Survey for the FDA's Jefferson Labs Campus Development Project, Jefferson County, Arkansas*
Panamerican Report No. 39011
AHPP Tracking Number: 102261.01

Dear Mr. Tapp:

The staff of the Arkansas Historic Preservation Program (AHPP) reviewed the above-referenced draft cultural resources report. The proposed undertaking entails demolition of several aging structures at the Federal Drug Administration's (FDA) Jefferson Labs Campus in Section 17, Township 4 South, Range 10 West in Jefferson County, Arkansas. As noted in the report, the Jefferson Labs Campus is part of a complex originally constructed in 1951-1952 for the United States Army biological weapons research and production facility at the Pine Bluff Arsenal.

The twenty-two buildings and structures slated for demolition include: Building 06 (warehouse), Structures 08 (two cylindrical storage tanks), Building 13 (administrative building), Building 15 (laundry), Building 16 (storage), Building 17 (refrigeration shop), Building 20 (cooling tower), Building 31 (library), Building 37 (underground bunker), Building 51 (unknown), Building 52 (munitions and ordnance assembly line), Buildings 53A through 53E (decontamination shower facilities), Building 60 (laboratory), Building 62 (laboratory), and Buildings 85A through 85C (munitions and ordnance assembly line).

The AHPP concurs with the methodology employed for the archaeological survey of amenable areas of the campus. The results of the archaeological survey proved negative. The current investigation also commented on the previous evaluation of several extant buildings and structures associated with the original campus. Most of these structures are included in the list proposed for demolition. The current investigation concurs with the recommendations from a 2005 project by Robinson & Associates, Inc. in association with LSY Architects that produced a report titled, *Preliminary*

Historic Preservation Report FDA: Jefferson Labs Jefferson, AK [*sic*]. The AHPP records do not indicate the proponent submitted the 2005 report for section 106 review.

The AHPP concurs that due to significant diminishment of integrity, the campus of the FDA Jefferson Labs is not eligible for inclusion in the National Register of Historic Places (NRHP) as a district. Similarly, the following seventeen buildings and structures affected by the proposed undertaking have significantly diminished integrity of interior and/or exterior elements and are therefore not individually eligible for inclusion in the NRHP: Buildings 06, Structures 08 (n=2), Building 13, Building 15, Building 16, Building 17, Building 20, Building 31, Building 51, Buildings 53A through 53E, Building 60, and Building 62.

The AHPP also concurs that Buildings 5A, B, C, and D, Building 37, Building 52, and Buildings 85A, B, and C are individually eligible for inclusion in the NRHP under Criterion A for their "association with events that have made a significant contribution to the broad patterns of our history." With the exception of Buildings 5A, B, C, and D, the five eligible properties noted above are slated for demolition.

5A, B, C, and D are not slated for demolition. Therefore, the proposed undertaking will not cause adverse effects to these historic properties. Buildings 37, 52, and 85A, B, and C are subject to demolition and will be adversely affected by the proposed undertaking. The nature of the undertaking does not allow for avoidance as a means for resolving adverse effects. The AHPP recommends the FDA consult with the Arkansas State Historic Preservation Officer (SHPO) to develop a memorandum of agreement (MOA) in accordance with 36 CFR § 800.6(b)(iv) that defines the means for resolving adverse effects. Fulfilling the terms of the MOA will evidence the agency's compliance with section 106 and allow the FDA to proceed with the proposed undertaking.

The AHPP recommends avoiding adverse effects to Buildings 5A, B, C, and D as part of any federal undertaking. We request the FDA consult with the AHPP if the agency determines an undertaking may cause adverse effects to these buildings.

Please note the following minor edit. On page 52, paragraph 4, Fort Chaffee, Arkansas is misspelled as Fort Chaffey, Arkansas. This was taken from the 2005 Robinson & Associates, Inc. report. We recommend correcting the spelling or adding [*sic*] to recognize the misspelling from the cited source.

The project lies within an areas of interest for several federally recognized tribal nations, including the Caddo Nation (Ms. Tamara Francis), the Cherokee Nation (Ms. Elizabeth Toombs), the Chickasaw Nation (Ms.

Karen Brunso), the Choctaw Nation of Oklahoma (Mr. Daniel Ragle), the Jena Band of Choctaw Indians (Ms. Alina J. Shively), the Muscogee (Creek) Nation (Ms. Corain Lowe-Zepeda), the Osage Nation (Dr. Andrea Hunter), the Quapaw Nation (Mr. Everett Bandy), and the Shawnee Tribe of Oklahoma (Ms. Tonya Tipton).We recommend federal agency consultation with tribal governments in accordance with 36 CFR § 800.2(c)(2).

Thank you for the opportunity to review this well-researched and interesting report. Please refer to the AHPP Tracking Number in all correspondence. If you have any questions or comments, please contact Eric Mills of my staff at 501-324-9784 or eric.mills@arkansas .gov.

Sincerely,

FOR Eric Mills

Scott Kaufman
Director, AHPP

cc: Hope Sharp, Pollution Management, Inc.
C. Andrew Buchner, Panamerican Consultants, Inc.
Dr. Ann Early, Arkansas Archeological Survey

3

THE DEPARTMENT OF ARKANSAS
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June 30, 2019

Mr. Gregory Tapp
Facilities Director
FDA – Jefferson Labs, Arkansas
Office of the Commissioner, Office of Operations, OFEMS
NCTR-50 RM 504 HFA-242
3900 NCTR Road
Jefferson, AR 72079

RE: Jefferson County — Jefferson
Section 106 Review — FDA
Conference Call Summary: FDA Jefferson Labs Buildings 37, 58, 85A, 85B, and 85C
AHPP Tracking Number: 102261.02

Dear Mr. Tapp:

This letter summarizes the conference call on April 17, 2019 between the Federal Drug Administration (FDA), Arkansas Historic Preservation Office (AHPP), Pollution Management, Inc., and Panamerican Consultants, Inc.

The call concerned Buildings 37, 52, 85A, 85B, and 85C at the FDA Jefferson Labs campus in Jefferson County, Arkansas. The buildings are slated for eventual demolition. In correspondence dated April 4, 2019, the AHPP concurred that the five buildings are individually eligible for listing in the National Register of Historic Places (NRHP) under Criterion A. The AHPP also found the proposed demolition would cause adverse effects to the properties. We recommended development of a memorandum of agreement (MOA) to outline the means of mitigating the adverse effects.

During the conference call we learned the FDA has no immediate plans to demolish Buildings 37, 52, 85A, 85B, and 85C. Considering the demolition may not occur for ten or more years, the AHPP agreed with the plan to forego development of an MOA at this time. However, in order to record the buildings concurrent with the NRHP eligibility determination, we did recommend completing AHPP Arkansas Architectural Resources Forms (AARF) and associated photographic documentation for the five buildings. We look forward to reviewing the AARF when they are available.

The project lies within an areas of interest for several federally recognized tribal nations, including the Caddo Nation (Ms. Tamara Francis), the Cherokee Nation (Ms. Elizabeth Toombs), the Chickasaw Nation (Ms. Karen Brunso), the Choctaw Nation of Oklahoma (Mr. Daniel Ragle), the Jena Band of Choctaw Indians (Ms. Alina J. Shively), the Muscogee (Creek) Nation (Ms. Corain Lowe-Zepeda), the Osage Nation (Dr. Andrea Hunter),

the Quapaw Nation (Mr. Everett Bandy), and the Shawnee Tribe of Oklahoma (Ms. Tonya Tipton).We recommend federal agency consultation with tribal governments in accordance with 36 CFR § 800.2(c)(2).

Please refer to the AHPP Tracking Number in all correspondence. If you have any questions or comments, please contact Eric Mills of my staff at 501-324-9784 or eric.mills@arkansas .gov.

Sincerely,

Scott Kaufman
Director, AHPP

cc: Hope Sharp, Pollution Management, Inc.
Dr. Ann Early, Arkansas Archeological Survey

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Arkansas Historic Preservation Program

Arkansas Natural Heritage Commission

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July 31, 2019

Mr. C. Andrew Buchner
Panamerican Consultants, Inc.
91 Tillman Street
Memphis, TN 38111

RE: Jefferson County — Jefferson
Section 106 Review — FDA
Arkansas Architectural Resources Forms — Jefferson Labs Buildings 5A, 5B, 5C, and 5D (JE1294), 37 (JE1295), and 52, 85A, 85B, and 85C (JE1296)
AHPP Tracking Number: 102261.03

Dear Mr. Buchner:

The staff of the Arkansas Historic Preservation Program (AHPP) reviewed the Arkansas Architectural Resource Forms (AARF) and associated documentation for Jefferson Labs Buildings 5A, 5B, 5C, and 5D (AHPP Resource Number JE1294), 37 (AHPP Resource Number JE1295), and 52, 85A, 85B, and 85C (AHPP Resource Number JE1296). The AHPP approves the documentation and concurs that in association with a memorandum of agreement (MOA) and in accordance with the stipulations therein, the AARF, photographs, drawings, and maps serve as sufficient mitigation to warrant a finding of no adverse effect for demolition of these historic properties.

To summarize for the record, the FDA has no immediate plans to demolish the buildings covered by this AARF documentation. Considering the demolition may not occur for ten or more years, the AHPP concurred with the plan to forego development of an MOA at this time. However, in order to record the buildings concurrent with the National Register of Historic Places eligibility determination, the AHPP recommended completing resource forms and associated documentation for the historic properties.

Thank you for the opportunity to review the outstanding documentation presented in your submission. Please refer to the AHPP Tracking Number in all correspondence. If you have any questions or comments, please contact Eric Mills of my staff at 501-324-9784 or eric.mills@arkansas.gov.

Sincerely,

Scott Kaufman
Director, AHPP

cc: Mr. Gregory Tapp, Food and Drug Administration
Ms. Hope Sharp, Pollution Management, Inc.
Dr. Ann Early, Arkansas Archeological Survey

Appendix F

Public Notice Affidavit and Announcement

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AUG 26 2019

POLLUTION MGMT, INC

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LITTLE ROCK, AR 72205

MAIL PAYMENT TO:
Pine Bluff Commercial
PO Box 6469
Pine Bluff, AR 71611

Reference # 135086

PUBLIC NOTICE
AVAILABILITY OF DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT AT JEFFERSON LABORATORIES
JEFFERSON, ARKANSAS
In accordance with the National Environmental Policy Act (NEPA), the Food and Drug Administration (FDA) has prepared a Draft Environmental Assessment (EA) for the Proposed Jefferson Labs Campus Development Project at Jefferson Laboratories and has made it available for public review and comment. The Draft EA assesses the potential environmental impacts of the Proposed Action to demolish aging structures, construct several new buildings and upgrade existing infrastructure within the Jefferson Labs Campus. The intent of the Proposed Action is to replace aging infrastructure and upgrade laboratories at the campus, as well as to provide sufficient data recovery for the campus and national FDA research activities.
The Draft EA is available for review at the following locations:
1. White Hall Public Library
300 Anderson Avenue, White Hall, AR 71602
2. Online at https://www.fda.gov/about-fda/nctr-location-facilities-services/environmental-assessment-jefferson-labs-campus-development-project
The public comment period will commence on August 3, 2019 and close on September 3, 2019.
The FDA encourages interested parties to review the Draft EA and provide written comments during the public comment period. Please submit written comments on the Draft EA to Mr. Gregory Tapp, Facilities Director, FDA - Jefferson Labs.
NCTR-50 RM504 HFA-242, 3900 NCTR Road, Jefferson Arkansas 72079 or by email at NCTRFONSI@FDA.HHS.GOV.

The legal advertising ran on the following dates:

08/03/2019

TOTAL CHARGES: $ 117.53

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STATE OF ARKANSAS
COUNTY OF JEFFERSON

[redacted], do solemnly swear that I am an employee of Gatehouse Media, owner of said daily newspaper printed and published in Jefferson County, State of Arkansas; That I was an employee of GateHouse Media at and during the publication of the annexed legal advertising in the case of:

PUBLIC NOTICE

Pending in court, in said County and at the dates of the several publications of said advertisement stated above, and that during said periods and at said dates said newspaper was printed and has a bona fide circulation in said County, and had a bona fide circulation therein for the period of more than one month before the date of the first publication of said advertisement, and that said advertisement was published in the regular weekly issue of said newspaper as stated above.

Subscribed and sworn to before me on this 13 day of Aug 2019.

[redacted]

Notary Public

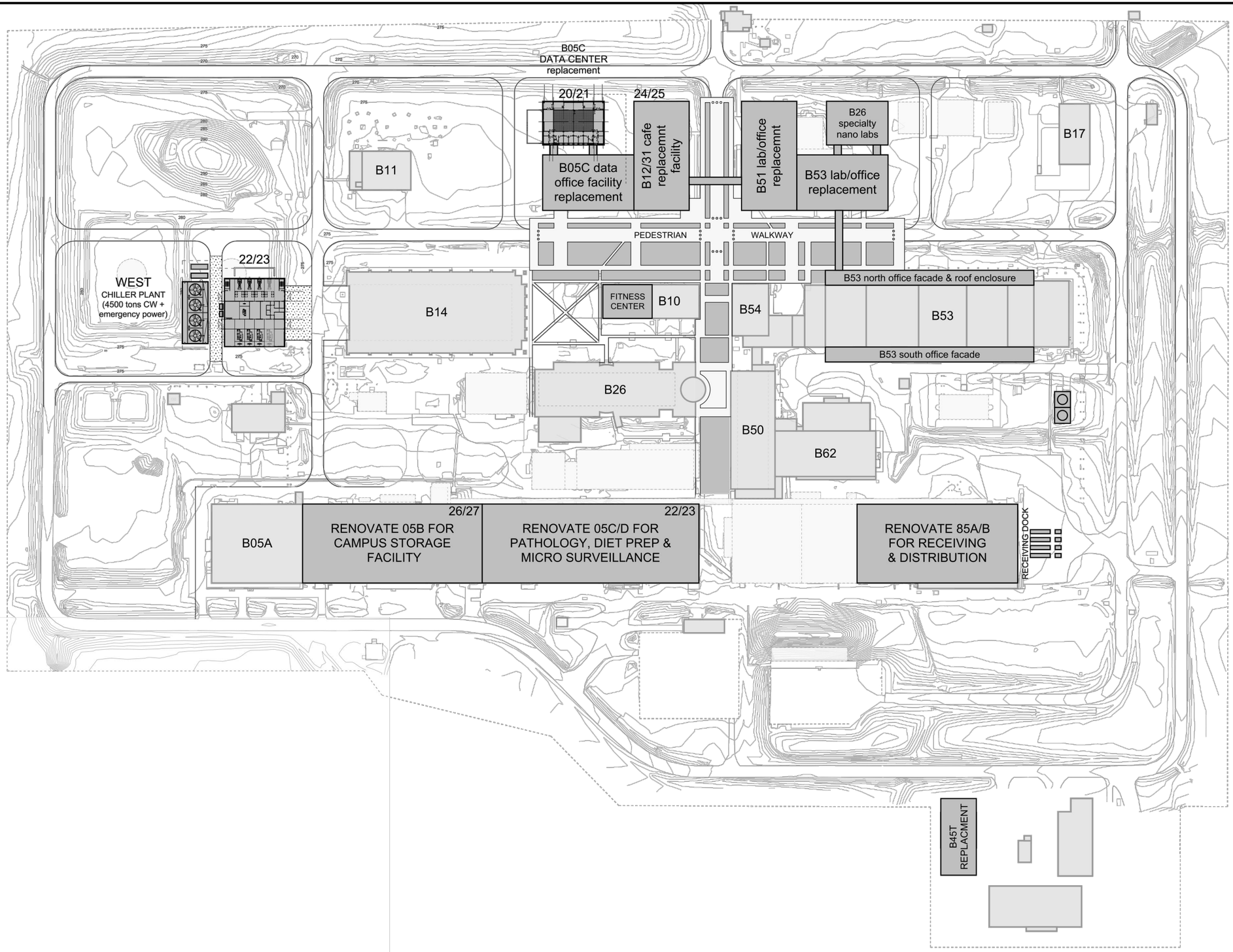
JENNIFER N. ALLEN NOTARY PUBLIC ARKANSAS HOT SPRING COUNTY 12690889 EXPIRES 8-8-2025

Appendix G

Report Supplement:
Proposed Campus Plan Schedule and Drawing – August 2019

Proposed Project Phases and Schedule - August 2019

Year	Building	Project Phase
2020-2021	18	Construct New SCF Data Center
2020	05D	Relocate Diet Prep from 05D to 05B
2020	05D	Replace 05D roof deck/insulation and roof system
2020-2021	Campus	Repair existing roads, parking and drainage
2021-2022	Campus	Repair existing utilities and install new east sanitary sewer
2022-2023	3	Construct new West Energy Chiller Plant
2023-2024	05D	Construct new lab/office area for pathology and diet prep
2024-2025	18	Construct new SCF Office Building facility
2024-2025	12	Construct new Food Services facility
2025	05B	Replace 05B roof deck/insulation and roof system
2026	05C	Replace 05C roof deck/insulation and roof system
2027-2028	05C	Construct new lab/office area for micro surveillance
2027	05B	Renovate 05B for new consolidated storage facility
2028-2029	8	Construct new Emerging Technology Center
2028-2029	85A/B	Renovate for Receiving & Distribution with new roof
2029-2030	53A/B/C/D/E	Construct new north and south office areas with metal roof
2029-2030	53B/C/D	Renovate second floor labs
2029-2030	53B/C/D/E	Renovate first floor for animal holding
2030-2031	45T	Construct new Campus Facility Support Building
2031-2032		Remove buildings 06, 08, 13, 15, 20, 31, 37, 46, 51, 52, 60 and 85C



CIVIL ENGINEERING AND
ENVIRONMENTAL SERVICES
3512 South Shackleford Road
Little Rock, Arkansas 72205
(501) 221-7122 fax (501) 221-7775

SUBMITTED:	H. SHARP
DRAWN:	D. MADDEN
CHECKED:	H. SHARP
DATE:	OCT 14, 2019

SCALE
0 200'

NEPA ENVIRONMENTAL ASSESSMENT
JEFFERSON LABS CAMPUS DEVELOPMENT PROJECT
3900 NCTR ROAD
JEFFERSON, ARKANSAS

PROPOSED CAMPUS PLAN – AUGUST 2019

JOB NUMBER
WERA-11258

FIGURE NO.
14

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