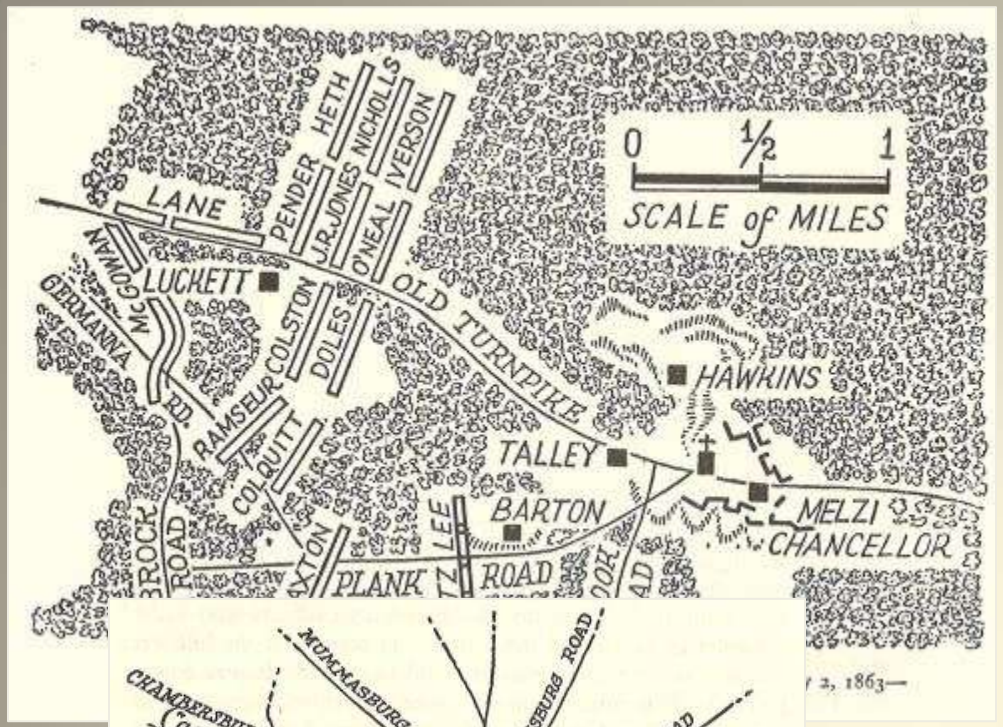
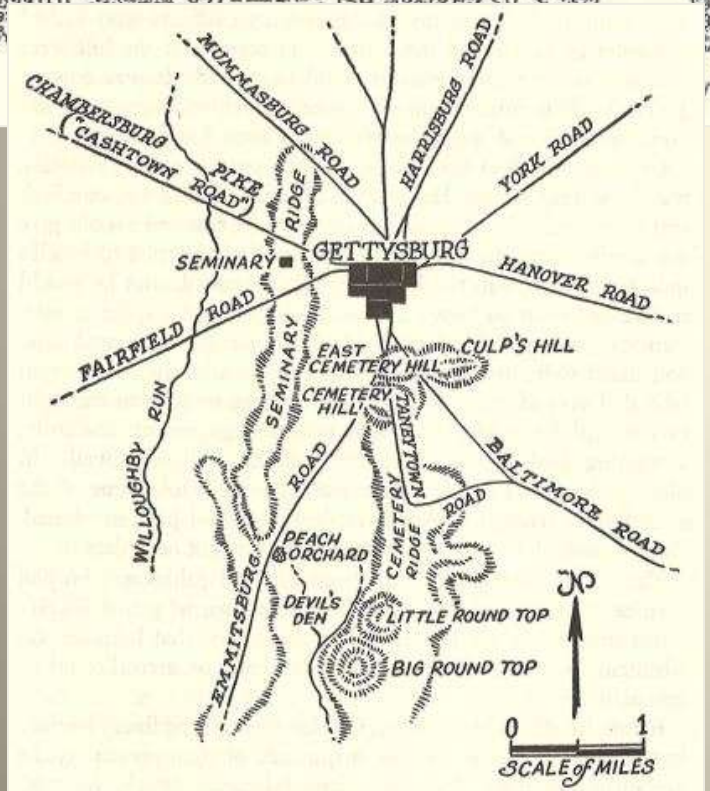
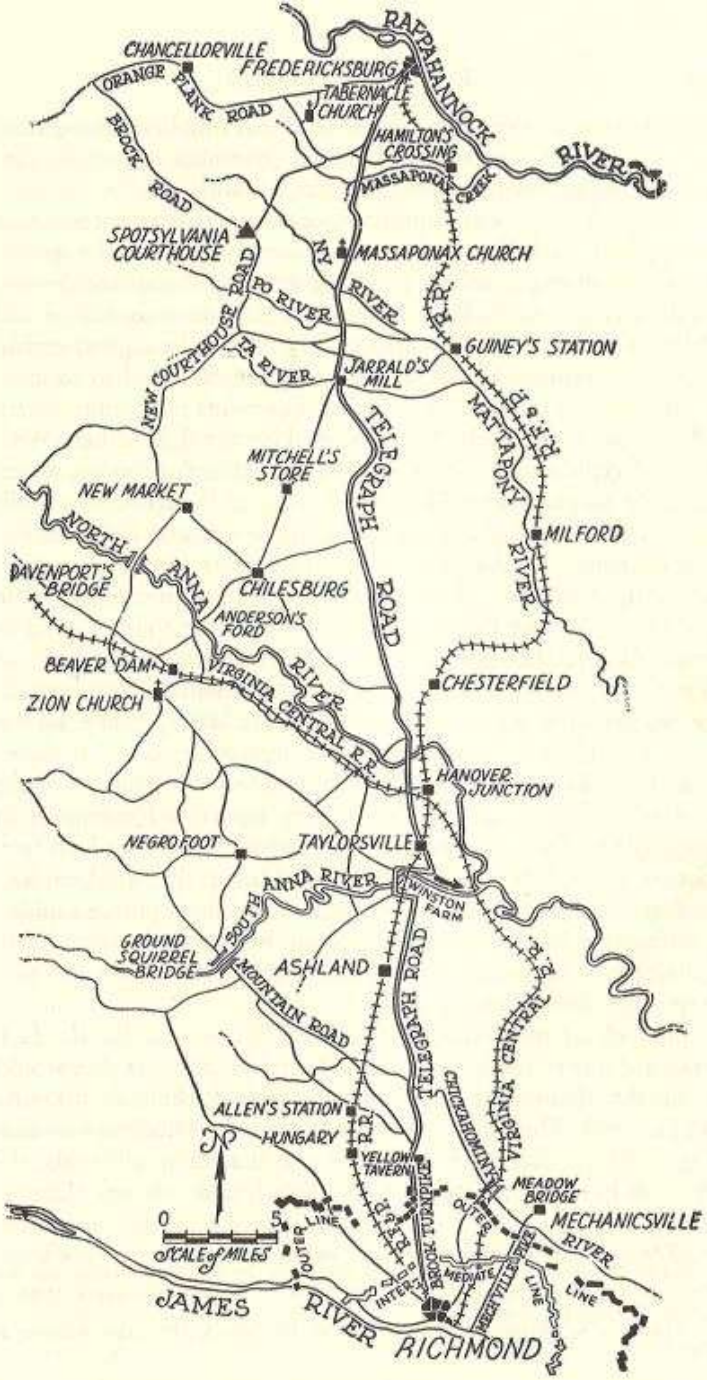
Using Geographic Information Systems to Delineate Battlefields

David W. Lowe
Cultural Resources GIS
National Park Service



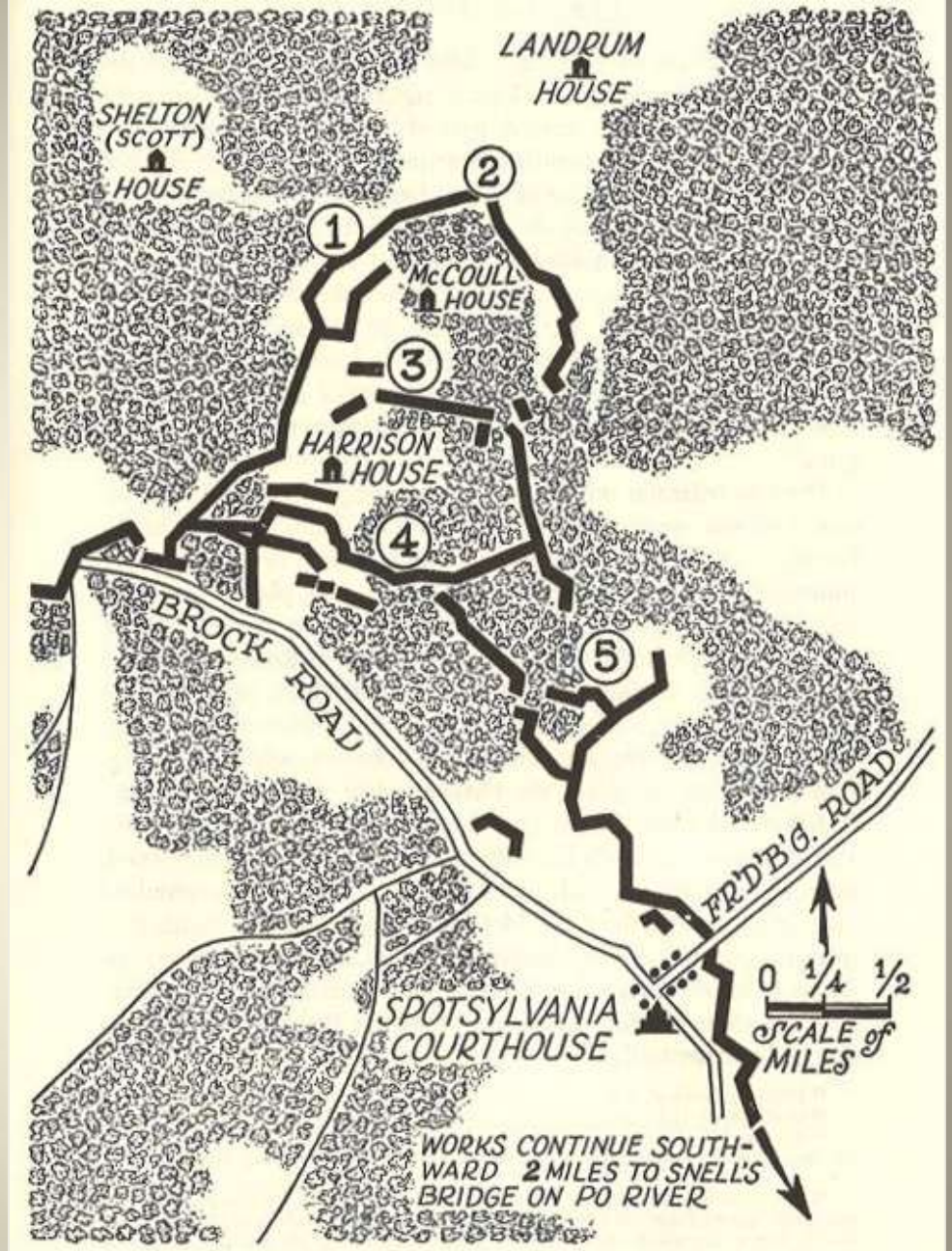


Gettysburg and Vicinity.

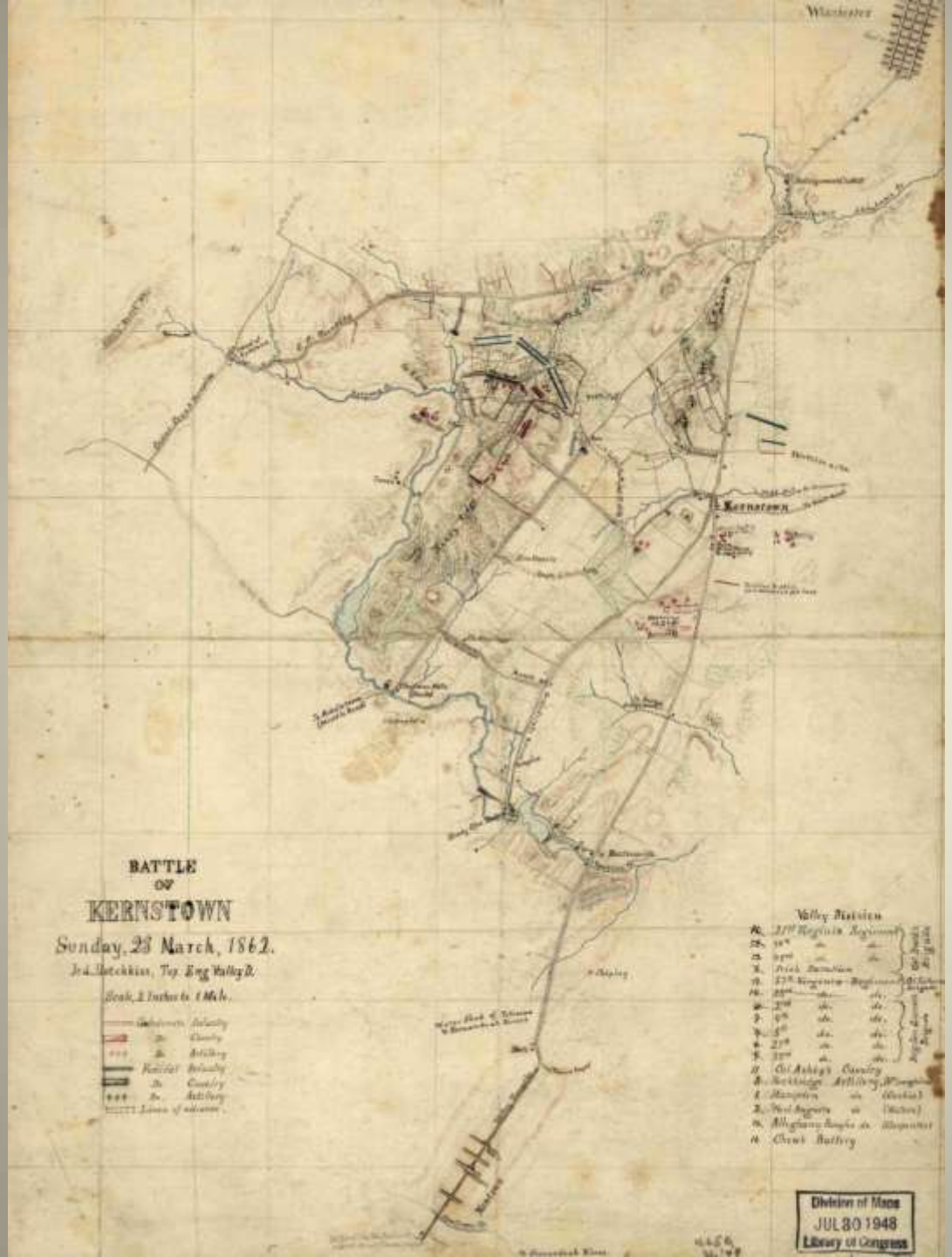


Sheridan's Raid and Stuart's Pursuit, May 9–11, 1864—after A. H. Campbell's Map of Portion of Eastern Virginia, 1864

Douglas Southall Freeman
(1886-1953)
Maps from *Lee's Lieutenants*



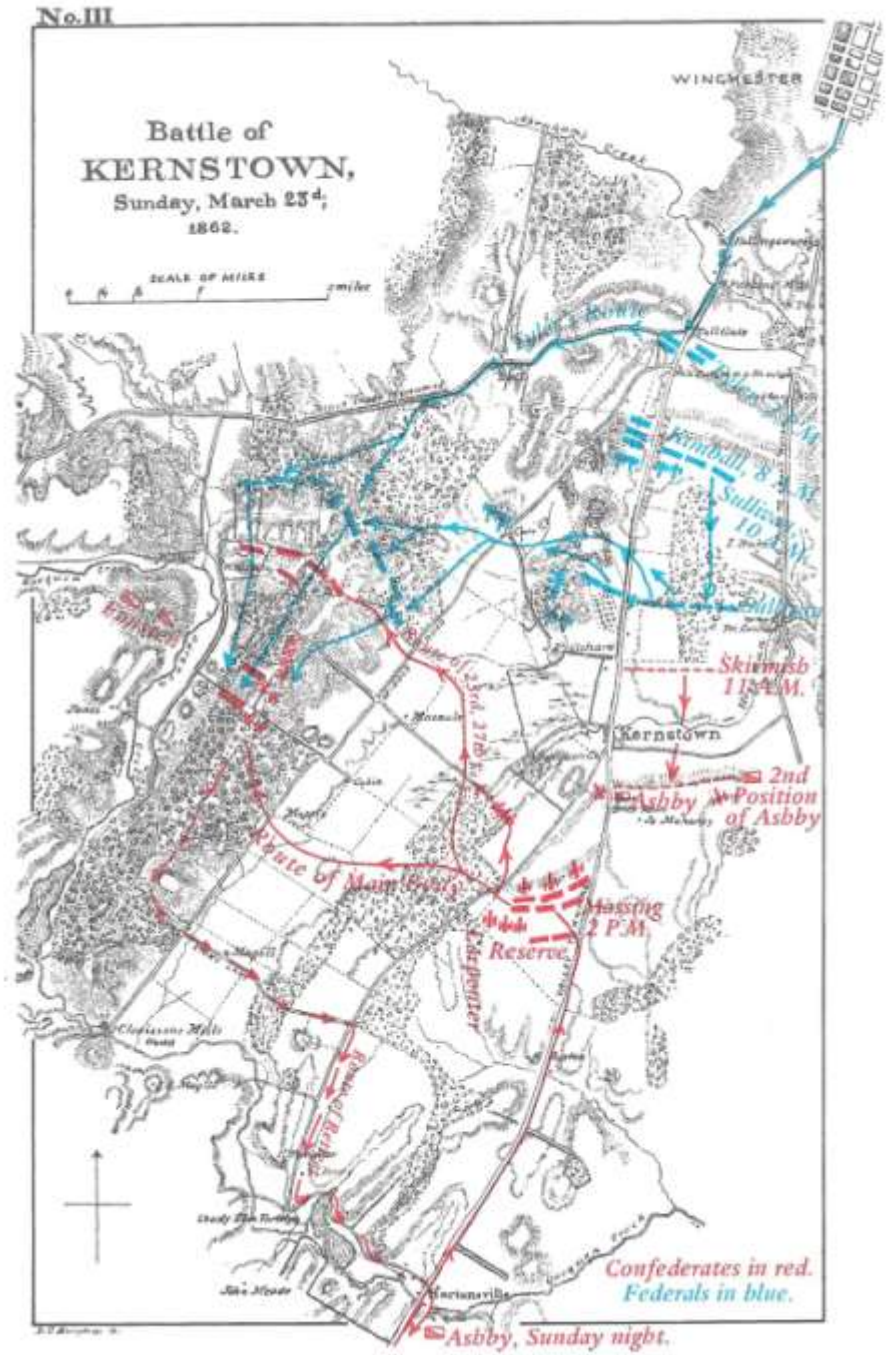
Final Confederate Works at the "Mule Shoe" or "Bloody Angle," continued southward to Spotsylvania Court House. The numerals indicate: 1, immediate objective of attack by Upton, May 10; 2, "the Apex," approximate point of Federal penetration, May 12; 3, "Gordon's Line" or "Incomplete Line," styled by the Federals the "Second Rebel Line"; 4, the line constructed May 12 and occupied that night; 5, "Heth's Salient." After the Michler map of 1867



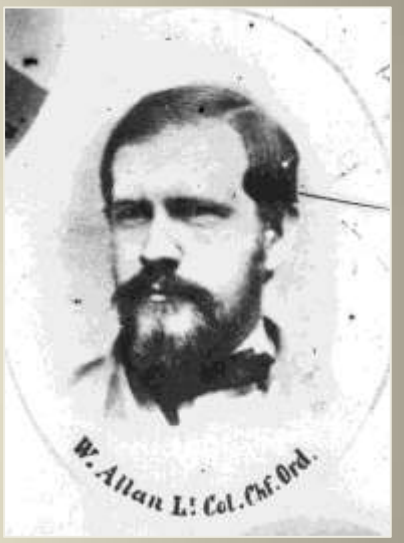
Mapmaker:
Jedediah Hotchkiss
Stonewall Jackson's cartographer

(1828-1899)

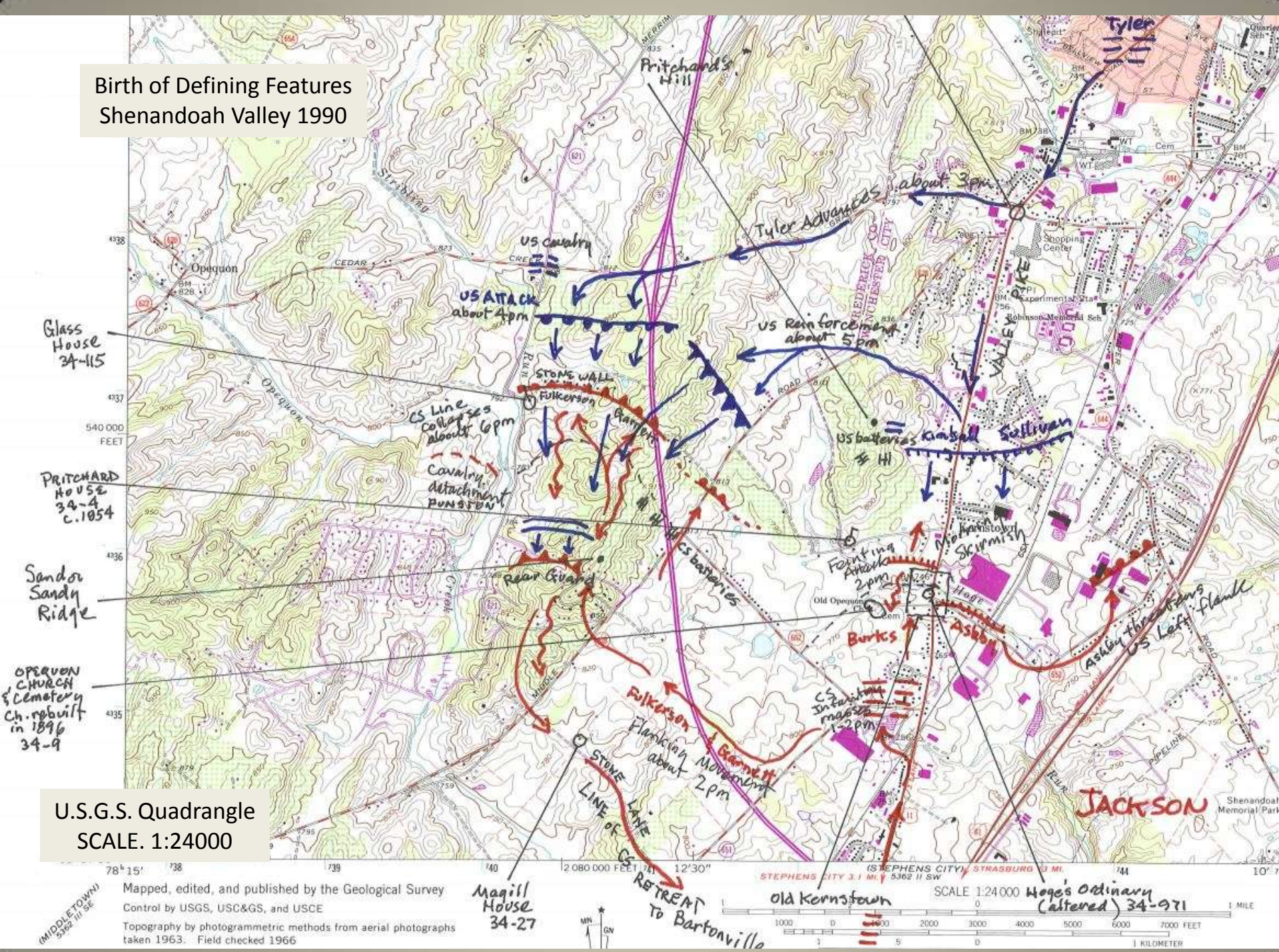
Hotchkiss Map Collection
LC cwh00090.jp2
Scale 2" = 1 mile



Author:
Col. William Allen
Jackson in the Shenandoah Valley Campaign, 1880

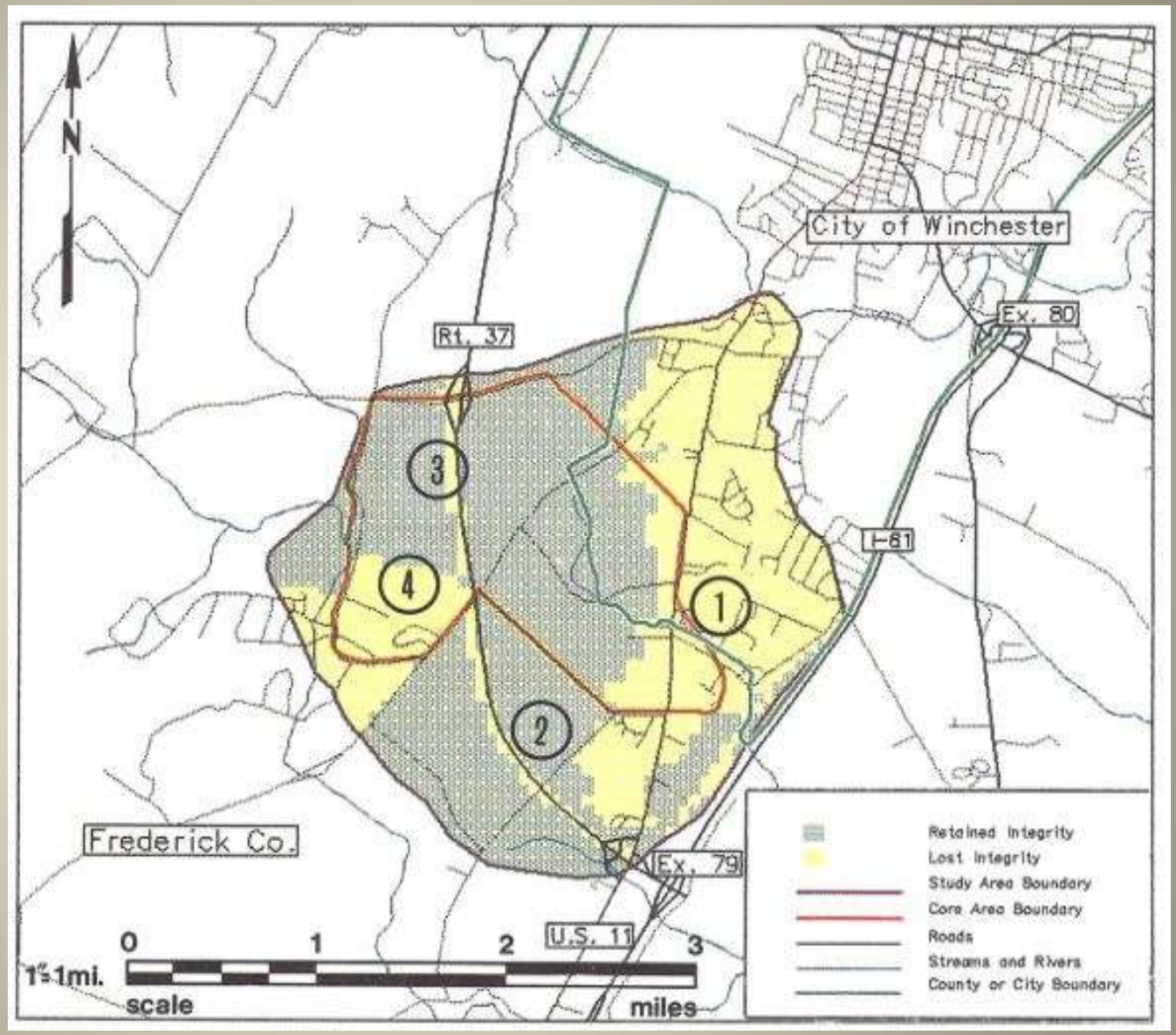


(1835-1894)


Birth of Defining Features
Shenandoah Valley 1990
U.S.G.S. Quadrangle
SCALE. 1:24000
Glass House 34-115
PRITCHARD HOUSE 34-4 c.1854
Sandor Sandy Ridge
OPEQUON CHURCH & Cemetery Ch. rebuilt in 1896 34-9
Magill House 34-27
Old Kernstown
Hoge's Ordinary (altered) 34-971
Pritchard's Hill
Tyler
Tyler Advances about 3pm
US cavalry
US ATTACK about 4pm
US Reinforcement about 5pm
US batteries
Kimball
Sullivan
Stone Wall
Fulkerson
Gamett
CS Line collapses about 6pm
Cavalry detachment Funsten
Rear Guard
CS batteries
Fronting Attack 2pm
Kernstown Skirmish
Burks
Ashby
Ashby threatens US Left Flank
CS Intervention massed 1-2pm
Fulkerson & Garnett Flanking Movement about 2pm
Stone Lane
Line of CS RETREAT to Bartonville
JACKSON
Opequon
Mapped, edited, and published by the Geological Survey
Control by USGS, USC&GS, and USCE
Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1966
SCALE 1:24000

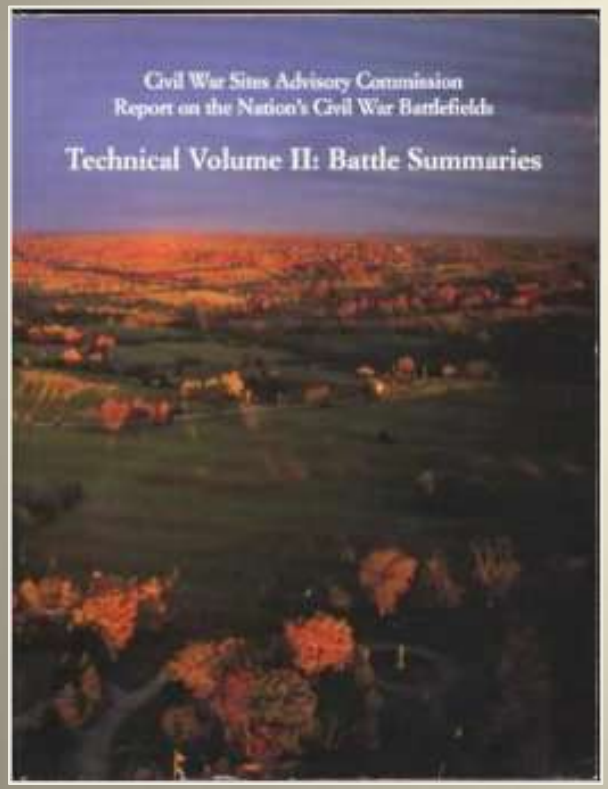
Battle of First Kernstown: Integrity Map (numbers keyed to battle phases). *Study of Civil War Sites in the Shenandoah Valley,* September 1992.

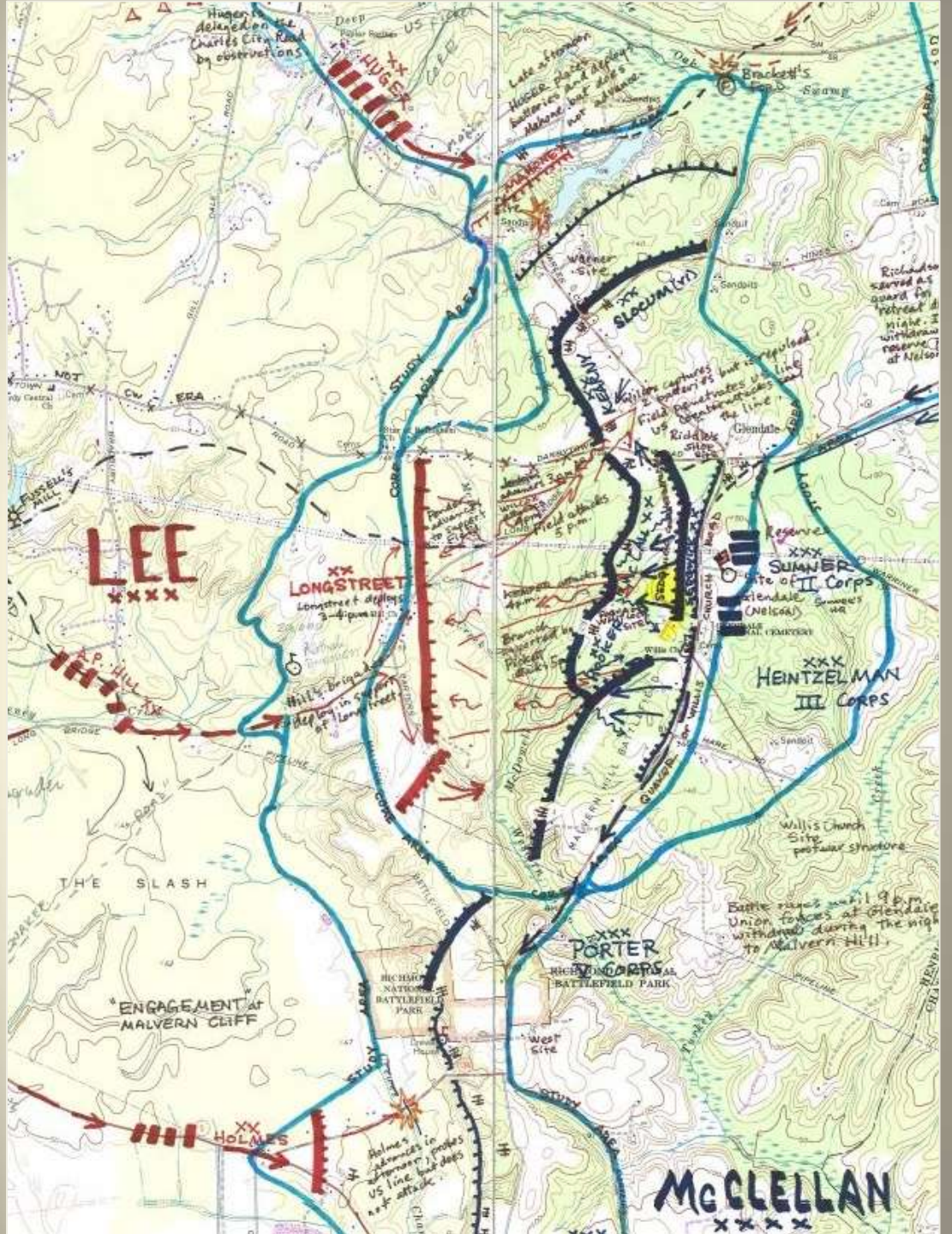
Introduction of Study and Core Areas



1993 Paper map by David Lowe based
On Troop Mov**eme**nt Maps drawn
By Edwin C. Bearss

Civil War Sites Advisory Commission
Survey of Battlefields 1990-1993
Battle of Glendale

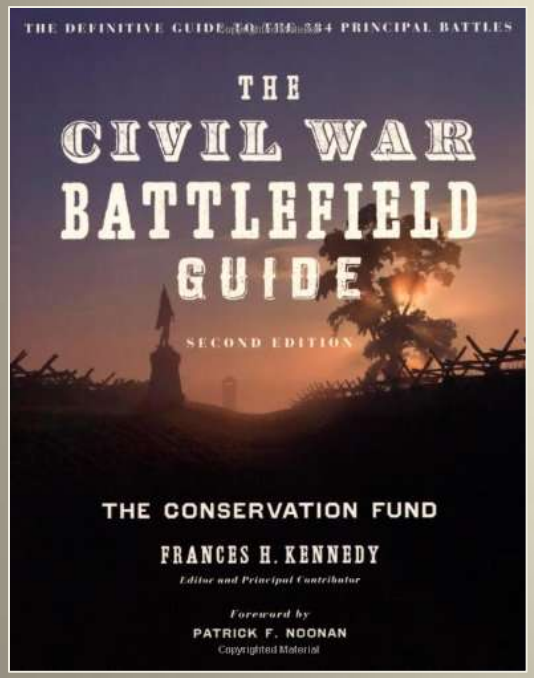


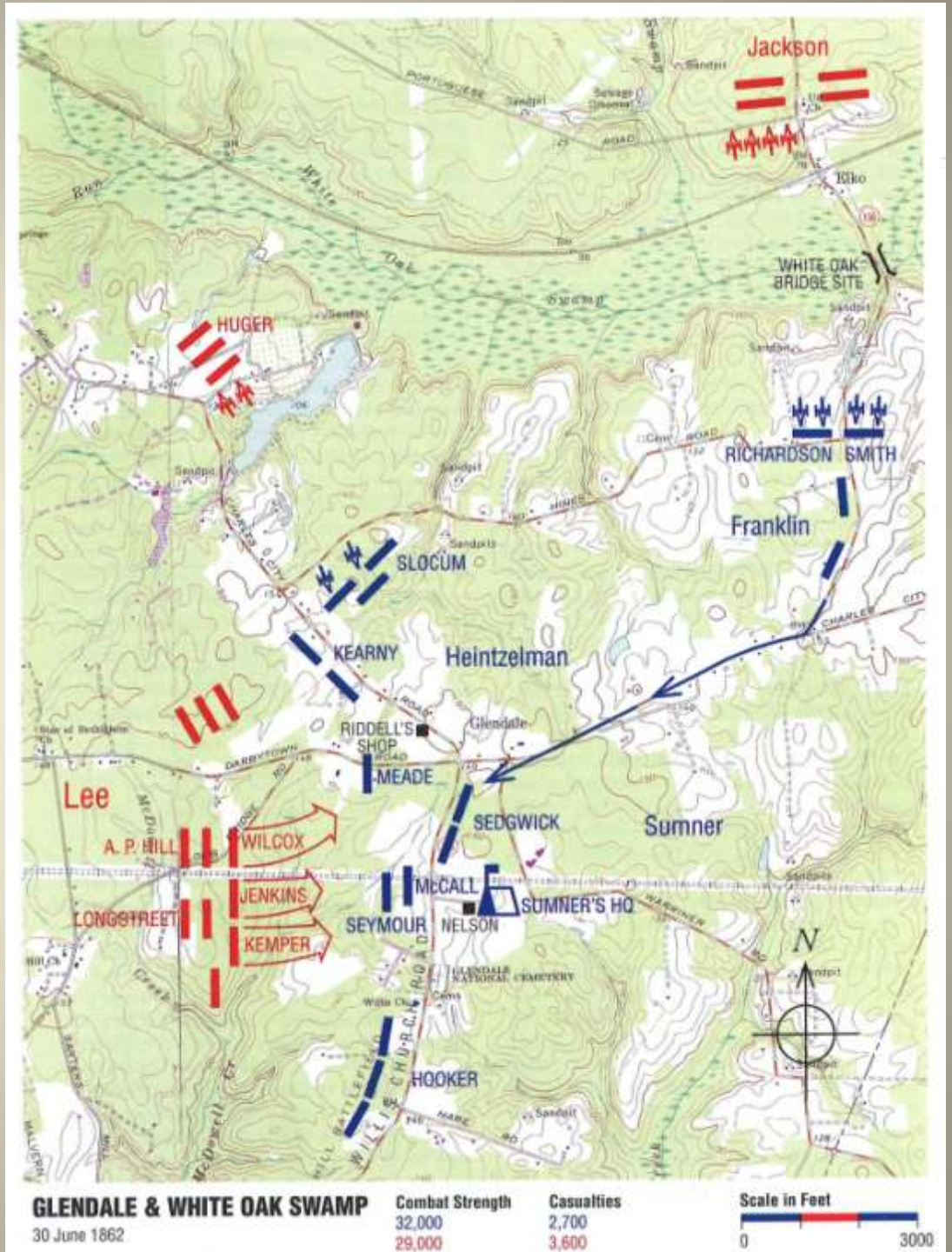


1998 Map of Glendale and White Oak Swamp

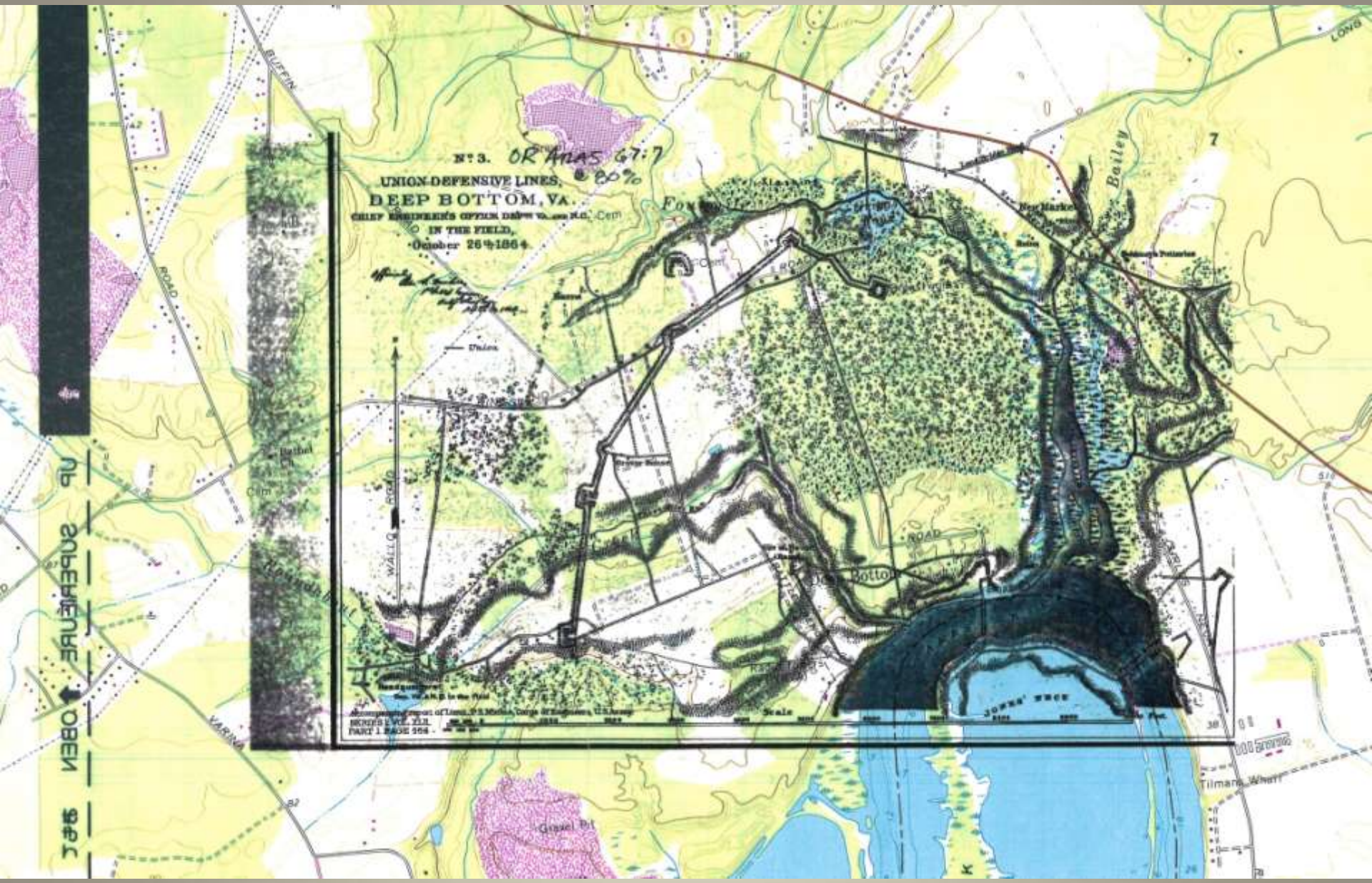
The Civil War Battlefield Guide 2nd Edition, Conservation Fund, Frances H. Kennedy, editor

Graphics on USGS Base





Geo-referencing Historic Maps

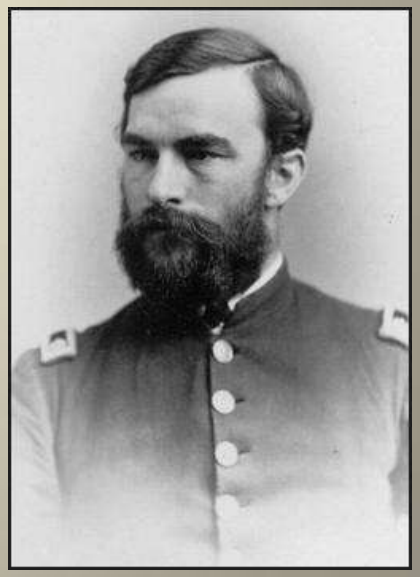


First “geo-referenced” historic map, using acetate, scaling, and photocopier.

Michler-Michie
Map Series
1864-1866

NARA
RG77
G204-33-
G204-60
30 sheets
580 square miles
8” = 1 mile

Nathaniel Michler
Army of the Potomac

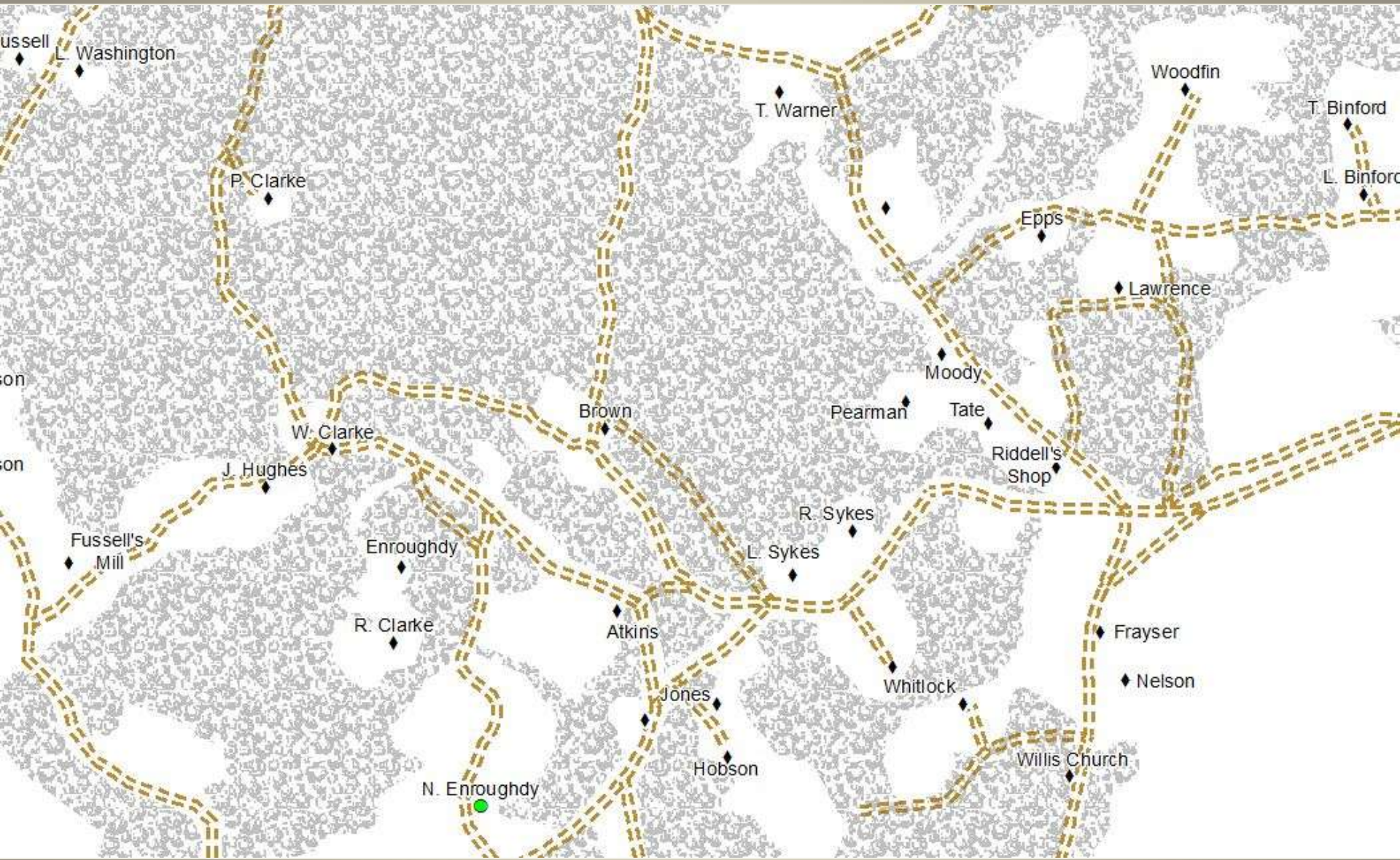


Peter S. Michie
Army of the James

Detail of an 1864-1866 map produced by Michler and Michie in the vicinity of Glendale.

(National Archives, Record Group #77, Map G 204-50)

Features digitized from Michler and Michie map series in the vicinity of Glendale.

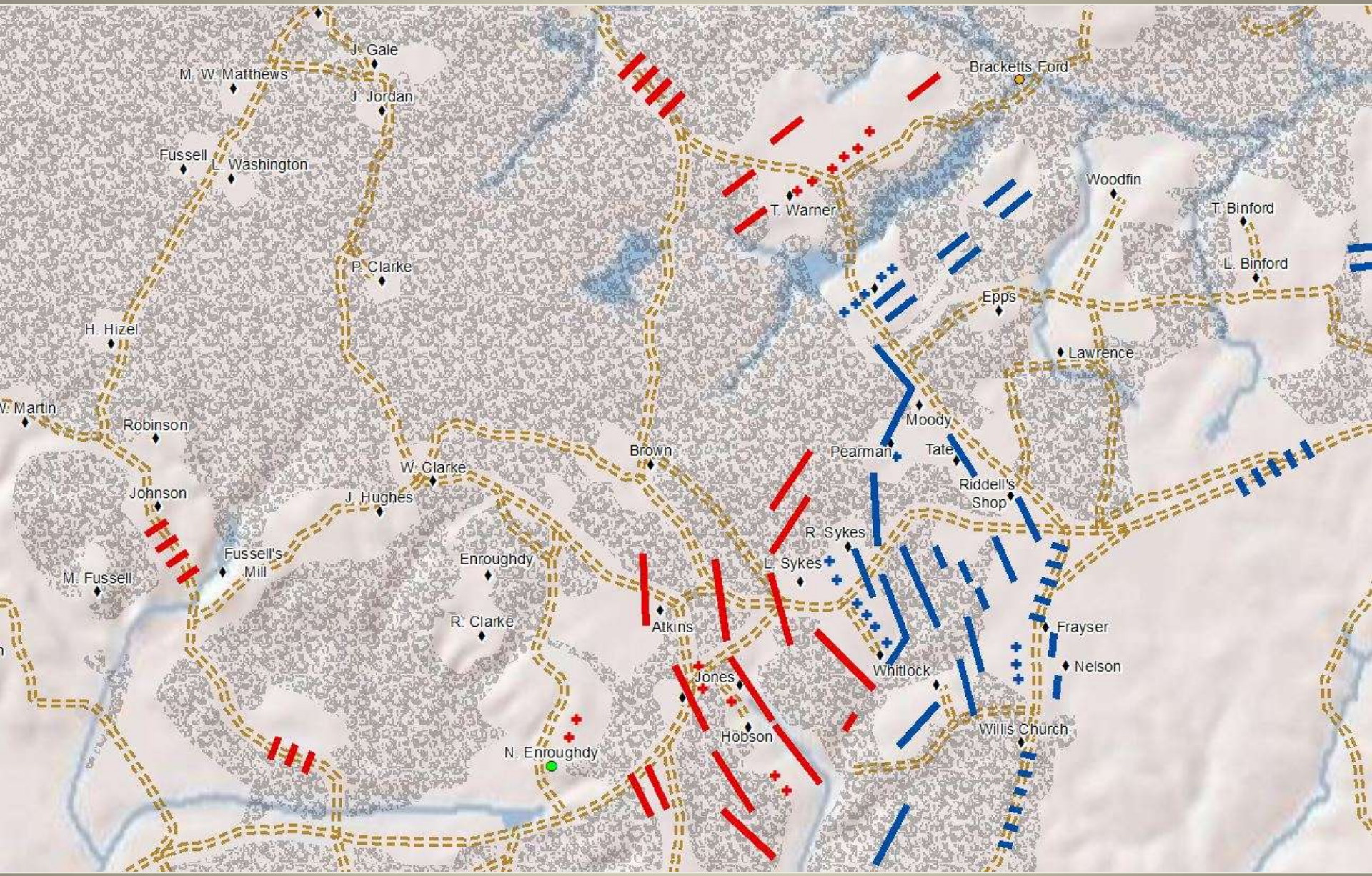


(National Archives, Record Group #77, Map G 204-50)

Features from Michler and Michie map series with added terrain.

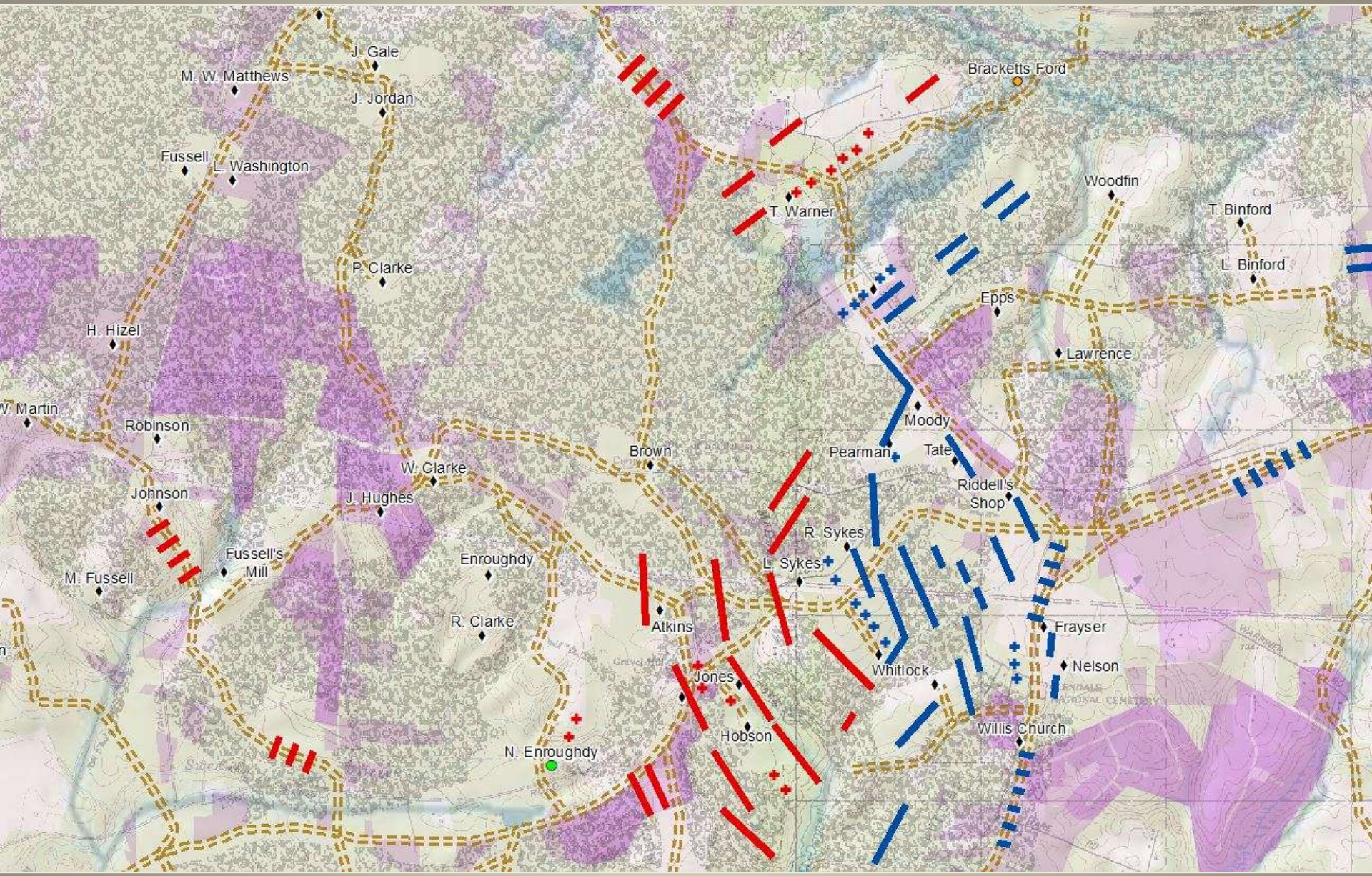
(National Archives, Record Group #77, Map G 204-50)

Features from Michler and Michie map series with troops and terrain.



(National Archives, Record Group #77, Map G 204-50)

Features from Michler and Michie map with USGS background and developed areas.



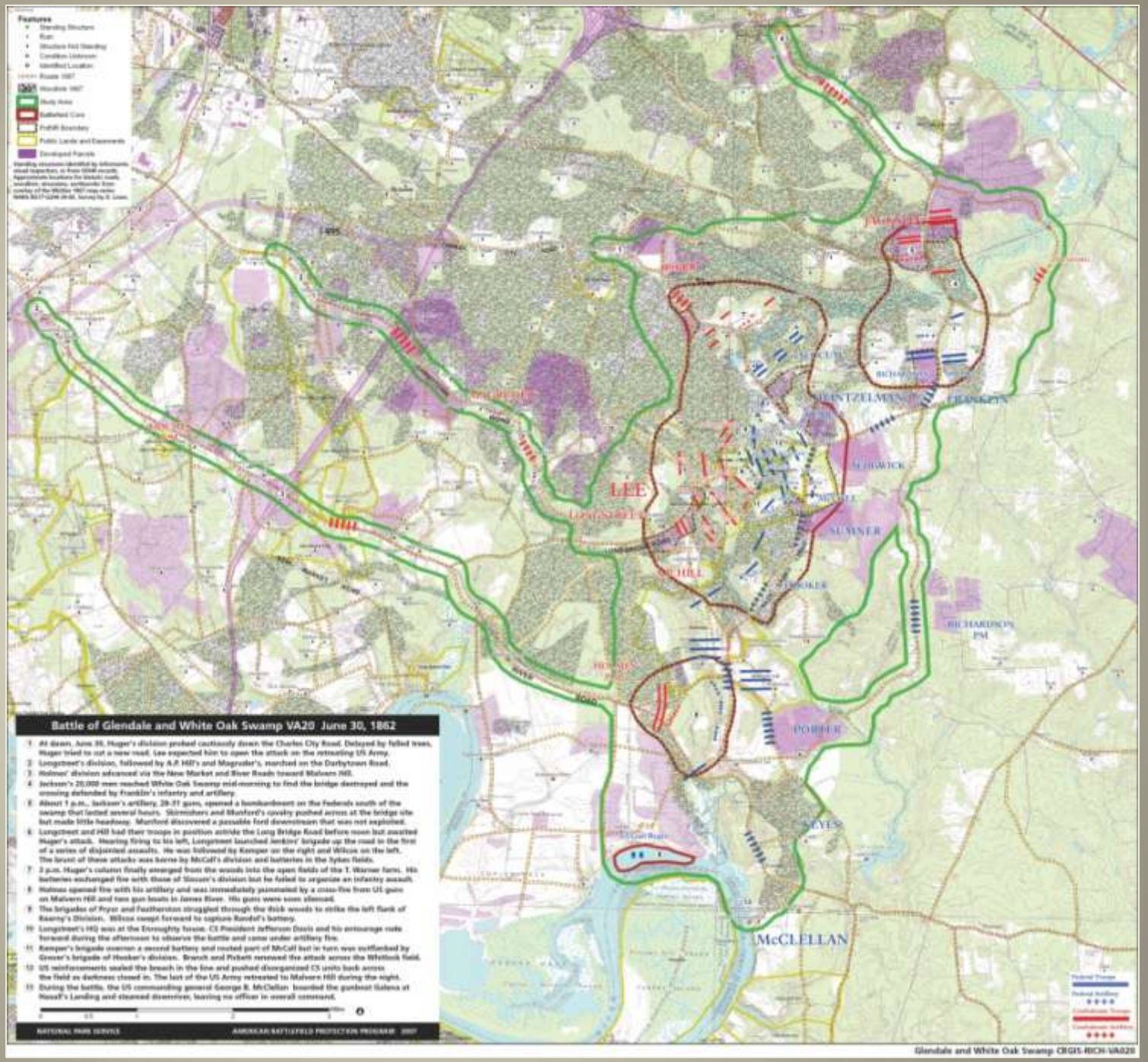
(National Archives, Record Group #77, Map G 204-50)

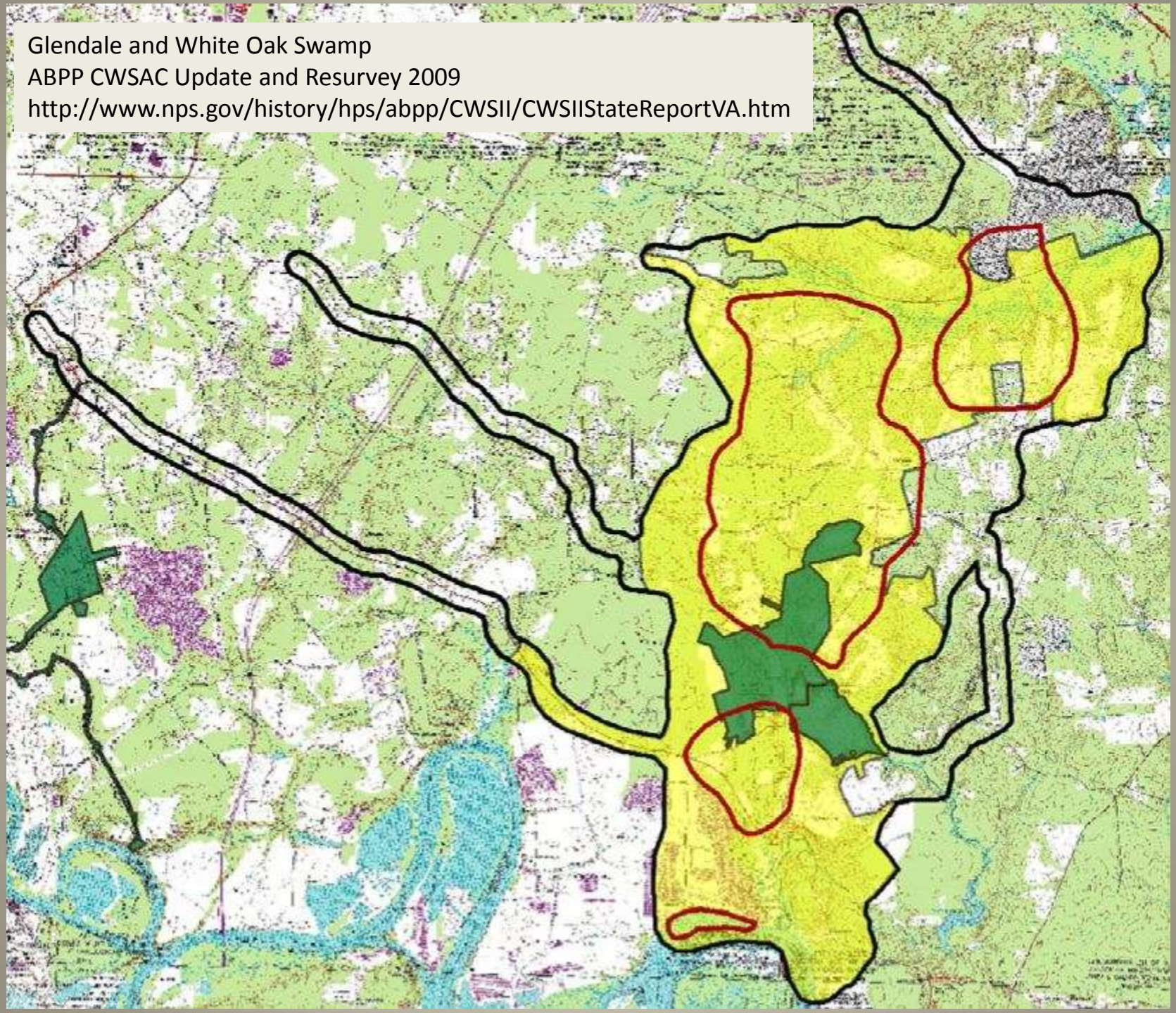
GLENDALE 2007

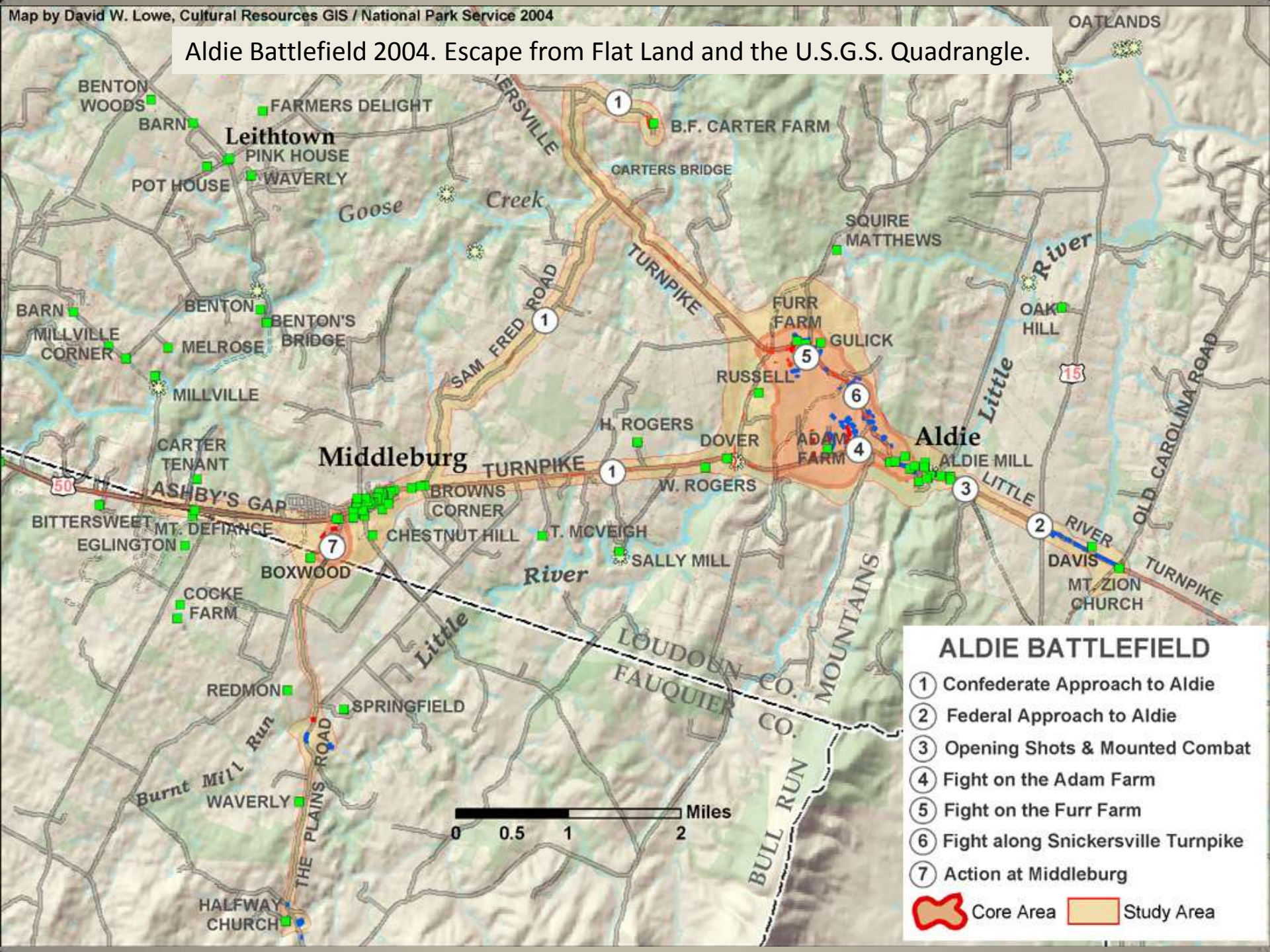
Map by David Lowe
Based on overlay of geo-referenced Michler maps at 8 inches to the mile.

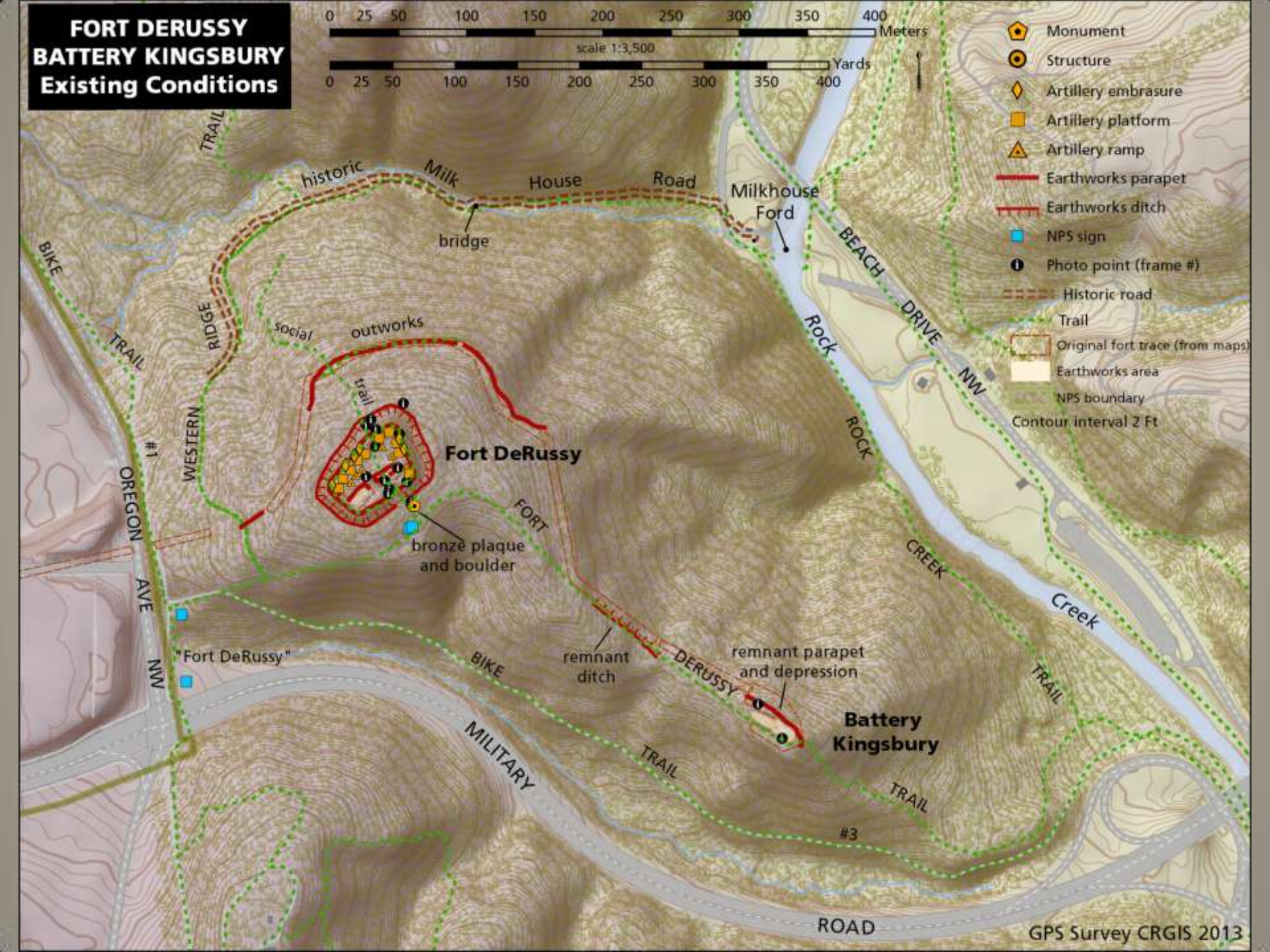
All data—roads, structures, wood lots, earthworks, troop positions, study and core areas—are now digital.

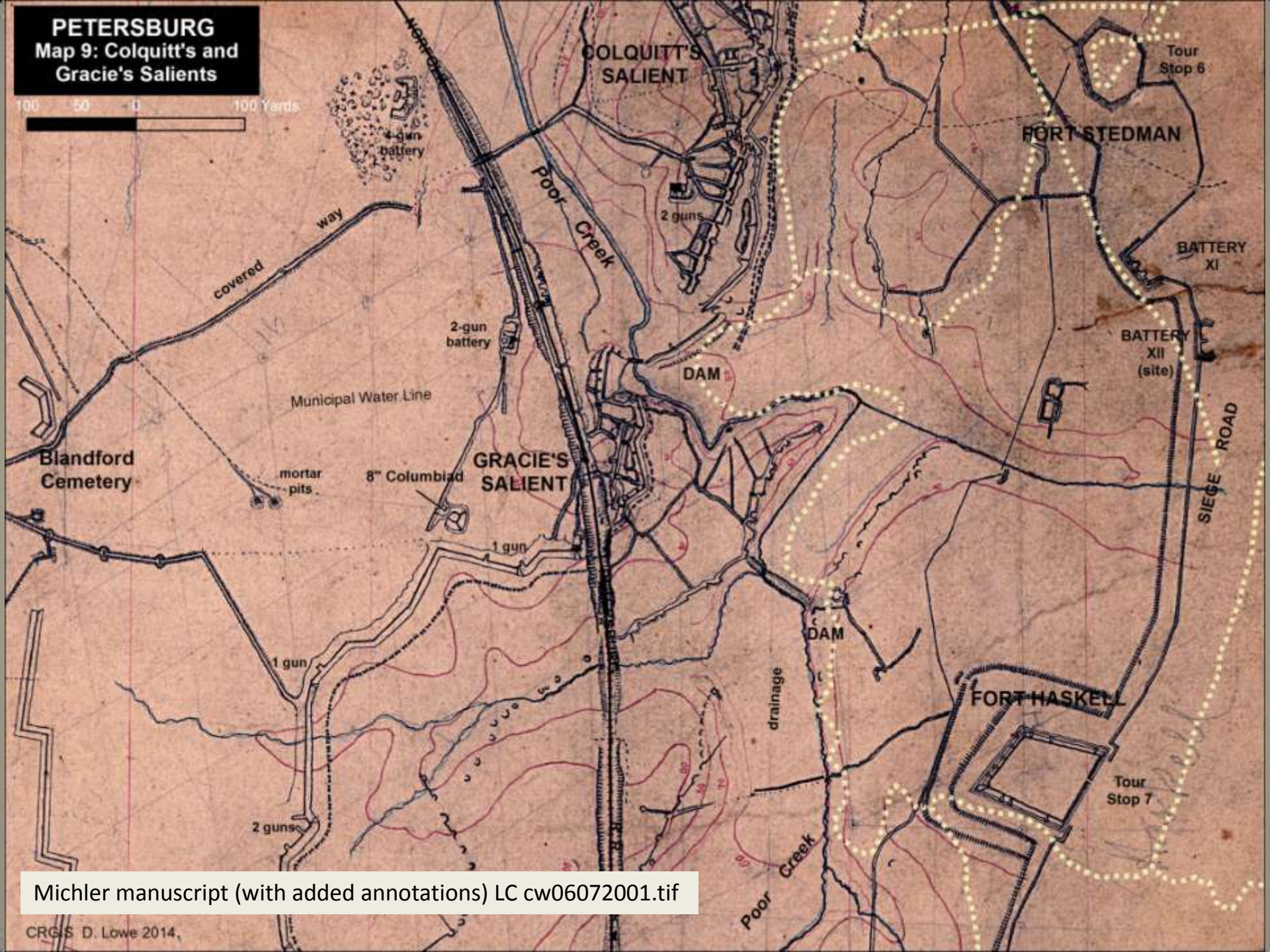
Development data from Henrico County.



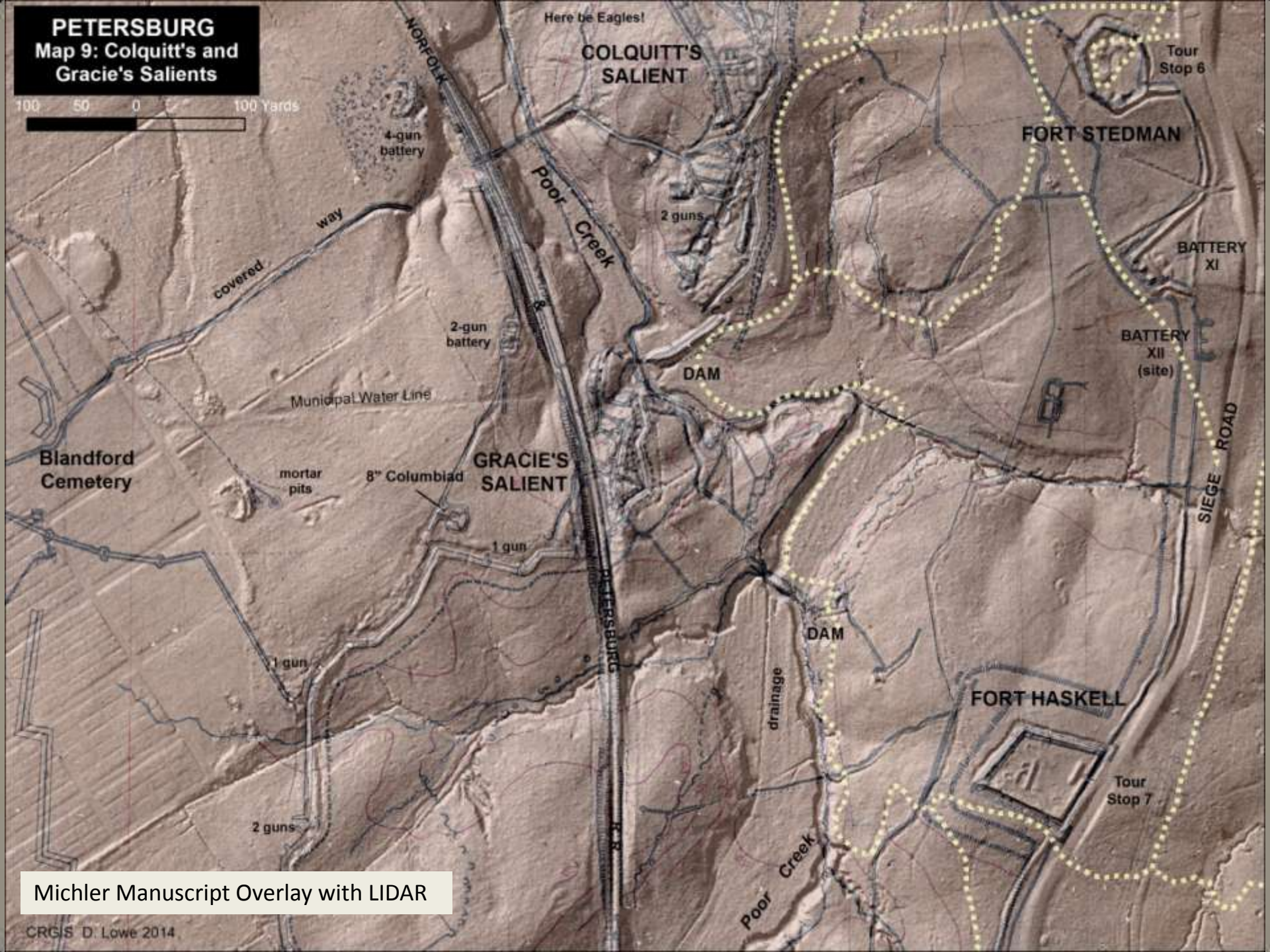

Glendale and White Oak Swamp
ABPP CWSAC Update and Resurvey 2009
http://www.nps.gov/history/hps/abpp/CWSII/CWSIIStateReportVA.htm

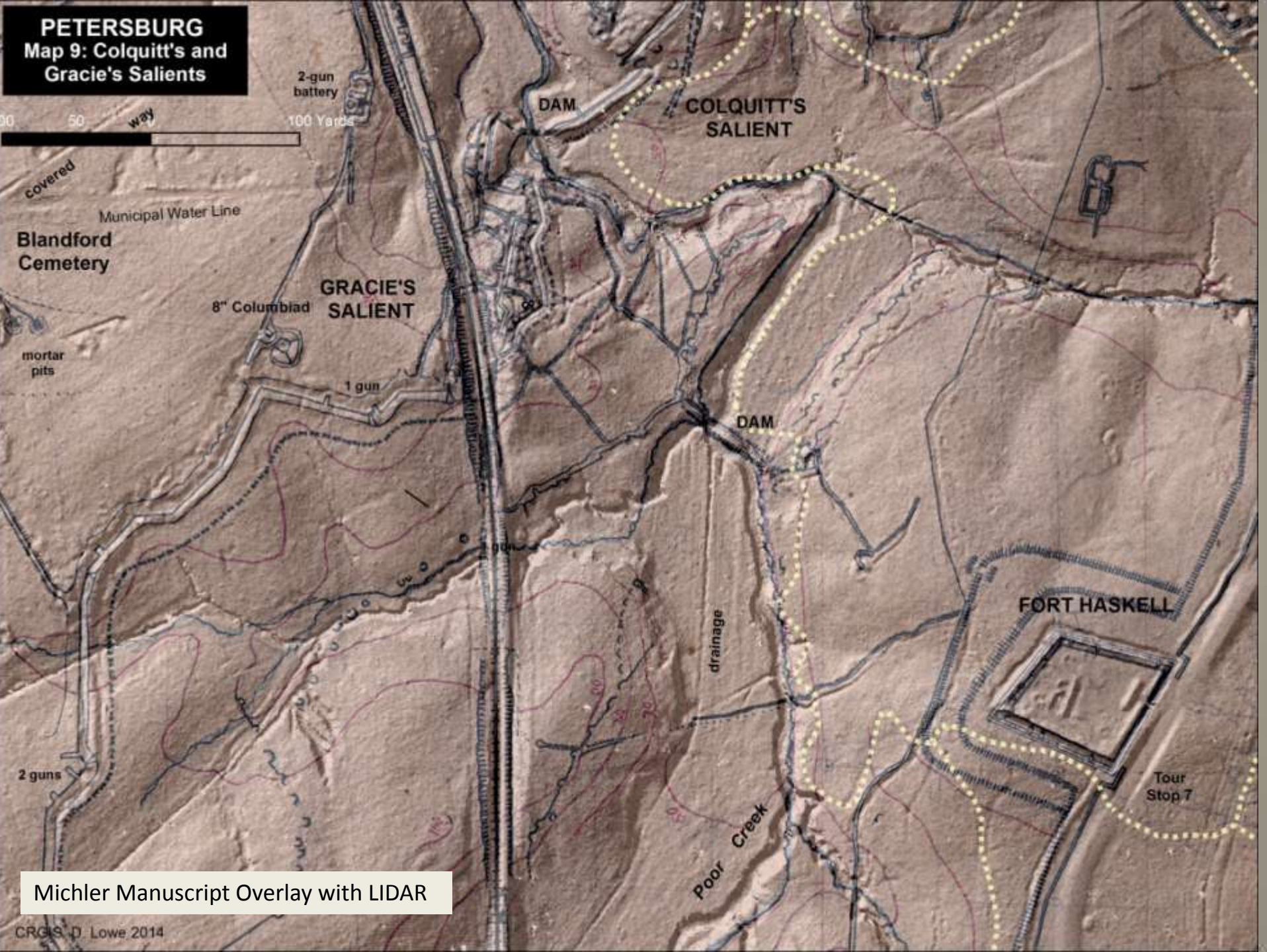

Map by David W. Lowe, Cultural Resources GIS / National Park Service 2004
Aldie Battlefield 2004. Escape from Flat Land and the U.S.G.S. Quadrangle.
OATLANDS
BENTON WOODS
FARMERS DELIGHT
BARN
Leithtown
PINK HOUSE
WAVERLY
POT HOUSE
B.F. CARTER FARM
CARTERS BRIDGE
Goose Creek
SQUIRE MATTHEWS
TURNPIKE
SAM FRED ROAD
FURR FARM
GULICK
RUSSELL
OAK HILL
Little River
OLD CAROLINA ROAD
BARN
BENTON
BENTON'S BRIDGE
MILLVILLE CORNER
MELROSE
MILLVILLE
H. ROGERS
DOVER
ADAM FARM
Aldie
ALDIE MILL
CARTER TENANT
Middleburg
TURNPIKE
ASHBY'S GAP
BROWNS CORNER
W. ROGERS
LITTLE RIVER
BITTERSWEET
MT. DEFIANCE
EGLINGTON
CHESTNUT HILL
T. MCVEIGH
SALLY MILL
BOXWOOD
River
DAVIS
MT. ZION CHURCH
TURNPIKE
COCKE FARM
Little
LOUDOUN CO.
FAUQUIER CO.
MOUNTAINS
REDMON
SPRINGFIELD
Burnt Mill Run
THE PLAINS ROAD
WAVERLY
BULL RUN
HALFWAY CHURCH
0 0.5 1 2 Miles
ALDIE BATTLEFIELD
1 Confederate Approach to Aldie
2 Federal Approach to Aldie
3 Opening Shots & Mounted Combat
4 Fight on the Adam Farm
5 Fight on the Furr Farm
6 Fight along Snickersville Turnpike
7 Action at Middleburg
Core Area
Study Area

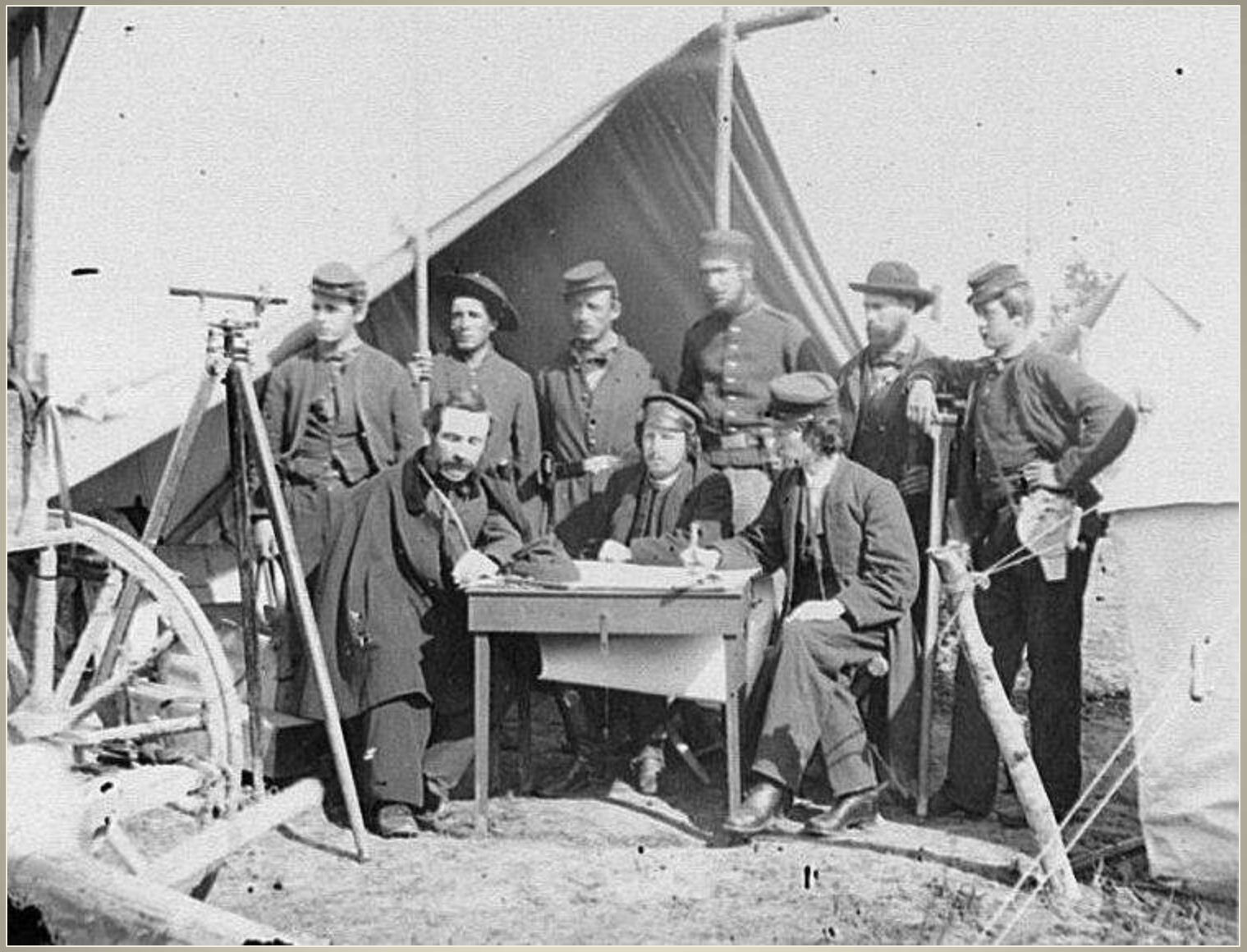

FORT DERUSSY
BATTERY KINGSBURY
Existing Conditions
0 25 50 100 150 200 250 300 350 400 Meters
scale 1:3,500
0 25 50 100 150 200 250 300 350 400 Yards
Monument
Structure
Artillery embrasure
Artillery platform
Artillery ramp
Earthworks parapet
Earthworks ditch
NPS sign
Photo point (frame #)
Historic road
Trail
Original fort trace (from maps)
Earthworks area
NPS boundary
Contour interval 2 Ft
historic Milk House Road
bridge
Milkhouse Ford
BEACH DRIVE NW
Rock Creek
Rock Creek
BIKE TRAIL
RIDGE
social
outworks
trail
WESTERN
#1
OREGON AVE NW
Fort DeRussy
FORT
bronze plaque and boulder
"Fort DeRussy"
remnant ditch
DERUSSY
remnant parapet and depression
Battery Kingsbury
BIKE
MILITARY
TRAIL
TRAIL
TRAIL
#3
ROAD
GPS Survey CRGIS 2013



Michler manuscript (with added annotations) LC cw06072001.tif


PETERSBURG
Map 9: Colquitt's and Gracie's Salients
100 50 0 100 Yards
Here be Eagles!
COLQUITT'S SALIENT
NORFOLK
4-gun battery
Poor Creek
2 guns
Tour Stop 6
FORT STEDMAN
BATTERY XI
covered way
2-gun battery
BATTERY XII (site)
DAM
Municipal Water Line
Blandford Cemetery
mortar pits
8" Columbiad
GRACIE'S SALIENT
SIEGE ROAD
1 gun
PETERSBURG R.R.
DAM
drainage
FORT HASKELL
Tour Stop 7
1 gun
2 guns
Poor Creek
Michler Manuscript Overlay with LIDAR
CRGIS D. Lowe 2014


PETERSBURG
Map 9: Colquitt's and Gracie's Salients
2-gun battery
DAM
COLQUITT'S SALIENT
100 Yards
covered way
Municipal Water Line
Blandford Cemetery
GRACIE'S SALIENT
8" Columbiad
mortar pits
1 gun
DAM
drainage
FORT HASKELL
Tour Stop 7
2 guns
Poor Creek
Michler Manuscript Overlay with LIDAR
CRGIS D Lowe 2014



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