



APPENDICES

Appendix A - Administrative Commitments and Right-of-Way Inventory

Appendix B - Existing Conditions Mapping

Appendix C - Wetlands Study

Appendix D - Facility Diagrams

Note: The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The NPS has made every effort to ensure that the information in this appendix document to the Facility Revitalization Plan is accessible. However, the appendix is not fully compliant with Section 508. If readers are in need of 508 compliance for this document, please contact 701-623-4466 if they would like to receive a 508 compliant PDF of the appendix.

APPENDIX A

ADMINISTRATIVE COMMITMENTS & RIGHT-OF- WAY INVENTORY

APPENDIX A

Administrative Commitments

Name	Agreement Type	Start Date	Expiration Date	Stakeholders	Purpose	Notes
Road Clearance – East River Road	Encumbrance	Unknown	Unknown	Town of Medora and landowners adjacent to park	The National Park Service is required to maintain and clear the snow from the East River Road, from the Medora entrance to the north boundary of the South Unit, for use by ranchers living adjacent to the park	This encumbrance was drawn from the 1992 Statement for Management, no other reference was given
Trail Rides	Concession Contract	1/1/09	12/31/18	Shadow Country Outfitters	To provide trail rides for park visitors in the South Unit during the summer season	A horse riding contract has been in existence since at least the 1960s
Cooperating Association	Commercial use authorization	10/1/12	9/3/14	Theodore Roosevelt Nature and History Association	To sell limited convenience items for visitors in three park visitor centers	Changed from Concessions Permit in past
Cooperating Association	Cooperating association agreement	10/18/10	10/17/15	Theodore Roosevelt Nature and History Association	To provide support for interpretation, education and research	Since 1951
Friends Group	Partnership agreement	7/25/11	Indefinite	Friends of Theodore Roosevelt National Park	Raise public awareness, engage youth; promote park mission and Theodore Roosevelt legacy	Current agreement
Information and Education	Memo of understanding	7/27/11	Indefinite	Theodore Roosevelt	Dickinson State University kiosk,	Current Agreement

				Center – Dickinson State University	digitization, symposia	
Mutual Assistance	Memo of Understanding	2/13/13	2/13/16	State Historical Society of North Dakota and three North Dakota national parks	Mutual aid and assistance on matters relating to history and historic sites	Current Agreement
Mutual Aid	Memo of Understanding	8/9/13	8/9/18	Billings County Sheriff's Department	To provide mutual aid for law enforcement and other incidents	Current Agreement
Mutual Aid	Memo of Understanding	7/15/13	7/15/18	McKenzie County Sheriff's Department	To provide mutual aid for law enforcement and other incidents	Current Agreement
Medical Control/ Director	Memo of Understanding	2/26/13	2/26/18	St. Joseph's Hospital	To provide medical control for park emergency medical technicians	Current Agreement
Radio Services	Special Use Permit	8/9/04	8/8/14	U.S. Forest Service	To share radio repeater tower	
Cooperating Agency Status	Memo of Understanding	6/22/11	12/31/15	U.S. Forest Service – Dakota Prairie Grasslands	Proposed gravel pit development near Elkhorn Ranch	Current Agreement
Scenic Byway Designation	Designation	2000	Indefinite	North Dakota Department of Transportation and Parks and Recreation Department	To designate the North Unit Scenic Drive as a state scenic byway	
Mutual Aid	Interagency Agreement	4/22/96	Indefinite	U.S. Fish and Wildlife Service	To provide mutual assistance for law enforcement	

					incidents and other needs	
Mutual Aid	Interagency Agreement	4/5/94	Indefinite	U.S. Forest Service/ Department of the Interior	To provide mutual assistance for law enforcement incidents and other needs	Nationwide Agreement
Fire Assistance	General Agreement	August 2008	Expired in 2011 but awaiting approval of new agreement	Billings County	To provide mutual assistance on wildland fires	
Fire Assistance	General Agreement	August 2008	Expired in 2011 but awaiting approval of new agreement	McKenzie County	To provide mutual assistance on wildland fires	
Fire Assistance	Memo of Understanding	Indefinite	Updated Annually	Federal Agencies	To provide mutual assistance on wildland fires	
NPS Affiliated Area	Unknown	Unknown	Indefinite	International Peace Garden	To provide planning assistance and financial pass-through	
Native Seed Services	Interagency Agreement	6/2013	3/15/2015	U.S. Department of Agriculture – Plan Materials Center	Reimbursement through Federal Highway Administration for propagation of native seed for vegetation restoration	
Interpretive Services	Medora City Council Decision	1998	Indefinite	City of Medora and Medora Chamber of Commerce	To provide bulletin board spaces for Medora activities and information at Painted Canyon	
Trail Management	Memo of Understanding	4/14/11	13/31/15	North Dakota Department	Cooperation in operation,	Current Agreement

				of Parks and Recreation/ U.S. Forest Service	maintenance and promotion of Maah Daah Hey Trail	
River Gauging Station	Agreement	9/11/89	Indefinite	U.S. Geological Survey	To maintain small building to house streamflow monitoring equipment in the North Unit	
Weather Observation	Co-op agreement	4/6/72	Indefinite	National Weather Service	To record official weather observations – South Unit	
Weather Observation	Co-op agreement	4/6/72	Indefinite	National Weather Service	To record official weather observations – North Unit	
Adopt-A Highway	Adopt-a-highway agreement	4/15/11	4/15/14	North Dakota Department of Transportation	To provide highway cleanup services twice per year	
Wildlife Transfer	Memo of Understanding	9/2013	9/2018	Intertribal Buffalo Council	To provide excess live bison to Tribes	
Wildlife Transfer	Memo of Understanding	In Progress	9/30/19	Dakota Zoo	To provide excess live bison to zoo	
Wildlife Transfer	Memo of Understanding	In progress	9/30/19	North Dakota Buffalo Association	To provide excess live bison to preserve	

Right-of-Way Inventory

Location	Use	Permittee	Permit Number	Start Date	End Date	Permit Type	Notes
North Unit	Telephone Line	Northwestern Bell Telephone	SP1540-83-01	8/1/83	7/31/13	Special Use Permit	Northwestern Bell was bought out by Reservation Telephone Cooperative.
South Unit	Transportation	Interstate 94, U.S. Department of Transportation	Unknown	None	None	Right-of-Way	I-94 was completed in 1969. I-94 was mostly built along or on top of the old U.S. 10 alignment. Therefore, a right-of-way was done for either old U.S. 10 or I-94.
North Unit	Electric Power Line	Western Area Power Administration	Unknown	None	None	Right-of-Way	Permanent right-of-way/ easement granted prior to the establishment of Theodore Roosevelt National Park.
South Unit	Water Pipeline	The State Historical Society of North Dakota	RW-1540-00-001	5/1/00	5/1/10	Right-of-Way	Replacement of existing water line.
South Unit	Water Pipeline	Southwest Water Authority	RW-1540-04-001	4/1/04	4/1/14	Right-of-Way	Waterline for Painted Canyon Visitor Center, in the process of renewing right-of-way.
North Unit	Electric Power Line	McKenzie Electrical Cooperative Inc.	RW-1540-03-001	9/1/03	9/1/13	Right-of-Way	Powerline for the North Unit.

South Unit	Micro Cell Site(s)	Verizon Wireless	RW-1540-07-001	5/1/08	11/1/18	Right-of-Way	Wireless telecommunication facility within park boundary. The annual fee of \$4,868 is active.
North Unit	Telephone Line	Reservation Telephone Cooperative	SP 6780-4-0002	7/1/73	6/1/03	Special Use Permit	Right-of-way request and repair/replacement of existing lines.
North Unit	Transportation	North Dakota Department of Transportation	MWR-THRO-6000-2011-012	6/1/11	2/1/15	Special Use Permit	Modification to North Dakota Highway 85, landslide repair required an addition to the existing right-of-way.
South Unit	Electric Power Line	West Plains Electrical Cooperative Inc.	RW-1540-04-001	9/1/04	9/1/14	Right-of-Way	Power source to the South Unit entrance station, will need to be renewed in 2014.
South Unit	Telephone Line	Midstate Telephone Company	SP 6780-4-0002	6/1/03	6/1/13	Right-of-Way	Renewal of right-of-way.
South Unit	Electric Power Line	Roughrider Electric Cooperative, Inc.	RW 1540-08-01	6/1/08	6/1/18	Right-of-Way	Ability to replace and maintain a 28-foot section of line.
South Unit	Infrastructure	Theodore Roosevelt Medora Foundation	RW-1540-08-02	6/1/08	6/1/18	Right-of-Way	Modification of an existing drainage ditch.

APPENDIX B

EXISTING CONDITIONS MAPS

APPENDIX B

Existing Conditions Mapping

South Unit - Medora Area

- Base Map
- Base Map Enlargement
- Ecosystems
- Geology
- Land Use
- Slope
- Soil Quality for Development
- Solar Potential

South Unit - Painted Canyon

- Base Map
- Slope

South Unit - Peaceful Valley

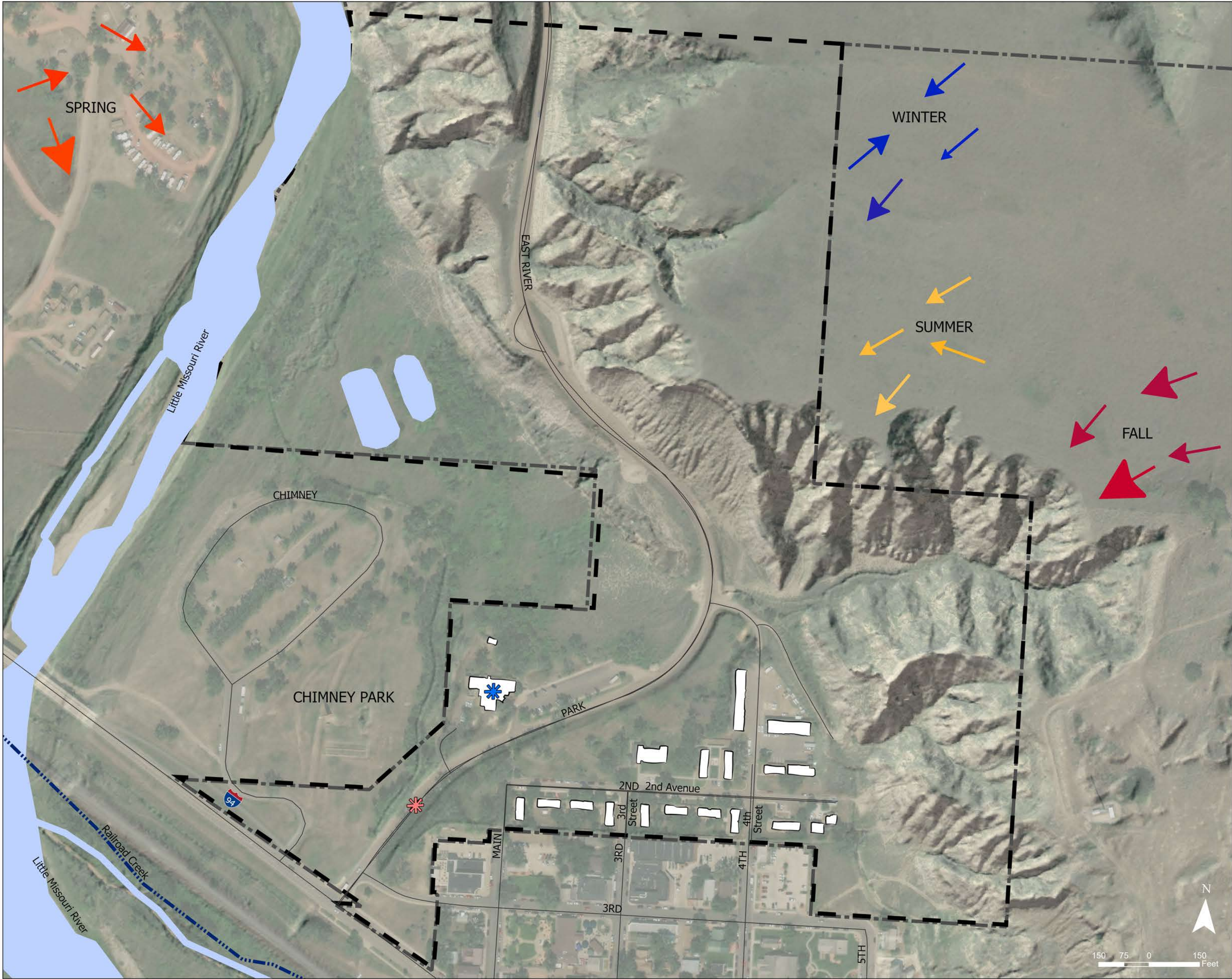
- Base Map

Elkhorn Ranch

- Base Map

North Unit – Entry and Housing/ Maintenance Areas

- Base Map
- Base Map Enlargement #1
- Base Map Enlargement #2
- Ecosystems
- Geology
- Land Use
- Slope
- Soil Quality for Development
- Solar Potential
- Viewshed



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Legend

Prevailing Winds - Seasonal
AWND (Average Wind Speed)
→ 10
TAVG (Average Temperature)

- 0.8
- 0.8 - 69.1
- 69.1

NPS Visitor Facilities

- Visitor Center
- Entry Station

NPS Buildings

- NPS Buildings

Roads

Hydrology

- Intermittent
- Rivers, Streams & Wetlands

Boundaries

- Study Area Boundary
- THRO Administrative Boundary



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Legend

NPS Visitor Facilities

- Visitor Center
- Entry Station

Building Primary Function

- Housing (4-Plex)
- Housing (Single Family)
- Operations
- Operations (Office)
- Visitor Services

Roads

Hydrology

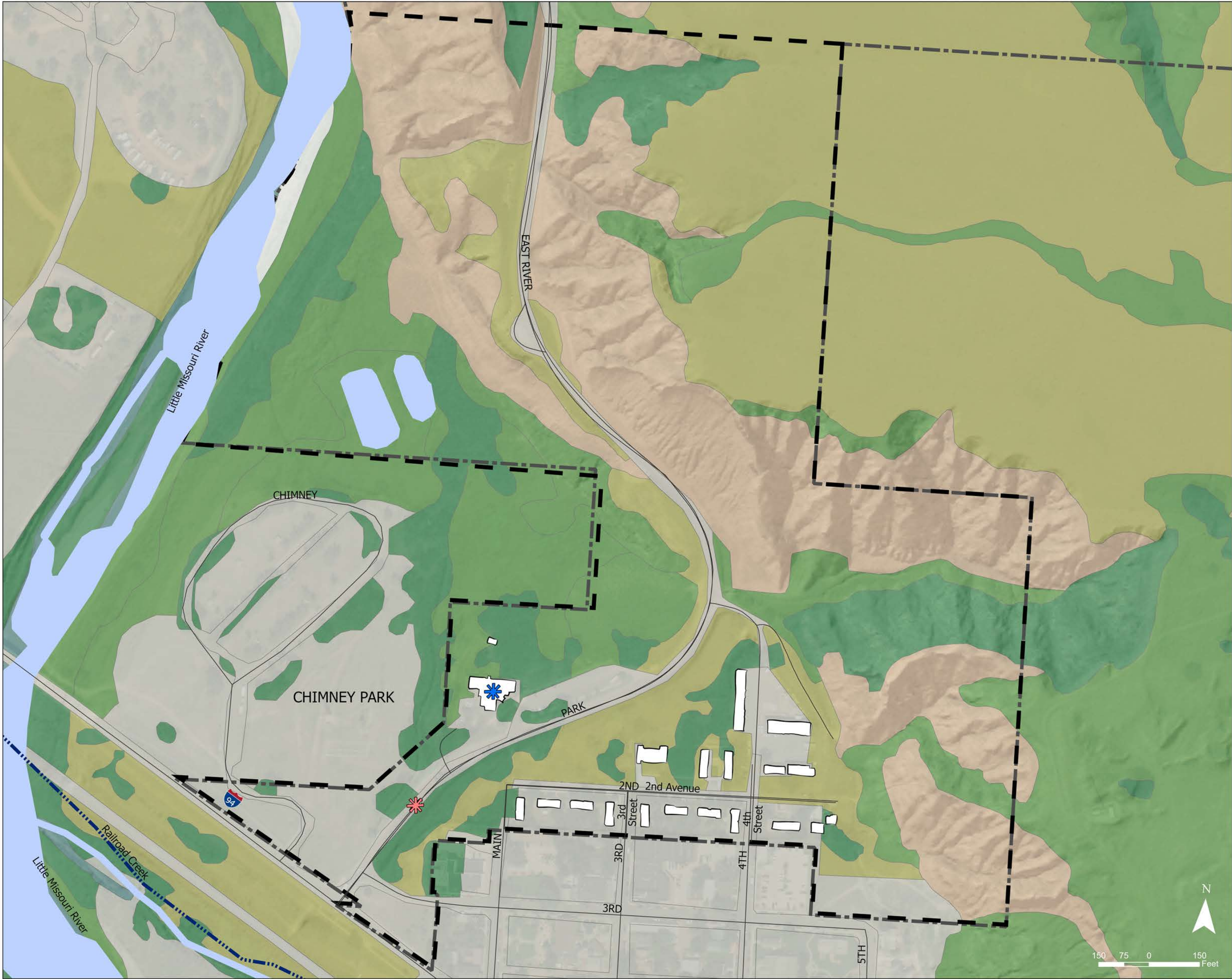
- Intermittent
- Rivers, Streams & Wetlands
- Artificial Wetlands
- Wetland Polygons
- Riverine Habitat
- Artificial Watercourse
- Estimated Streams
- Stream Lines

Boundaries

- Study Area Boundary
- THRO Administrative Boundary



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Legend

NPS Visitor Facilities

- Visitor Center
- Entry Station

NPS Buildings

- NPS Buildings

Roads

Hydrology

- Intermittent
- Rivers, Streams & Wetlands

Boundaries

- Study Area Boundary
- THRO Administrative Boundary

Vegetation Mapping (1996)

- Agriculture Area
- Developed Area
- Forbland
- Grassland
- Invasive Species Infestation
- Other/Unknown (See Other Notes)
- Shrubland
- Sparse Vegetation
- Water
- Wetland
- Woodland



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Legend

NPS Visitor Facilities

- Visitor Center
- Entry Station

Roads

Hydrology

- Intermittent
- Rivers, Streams & Wetlands

Boundaries

- Study Area Boundary
- THRO Administrative Boundary

NPS Buildings

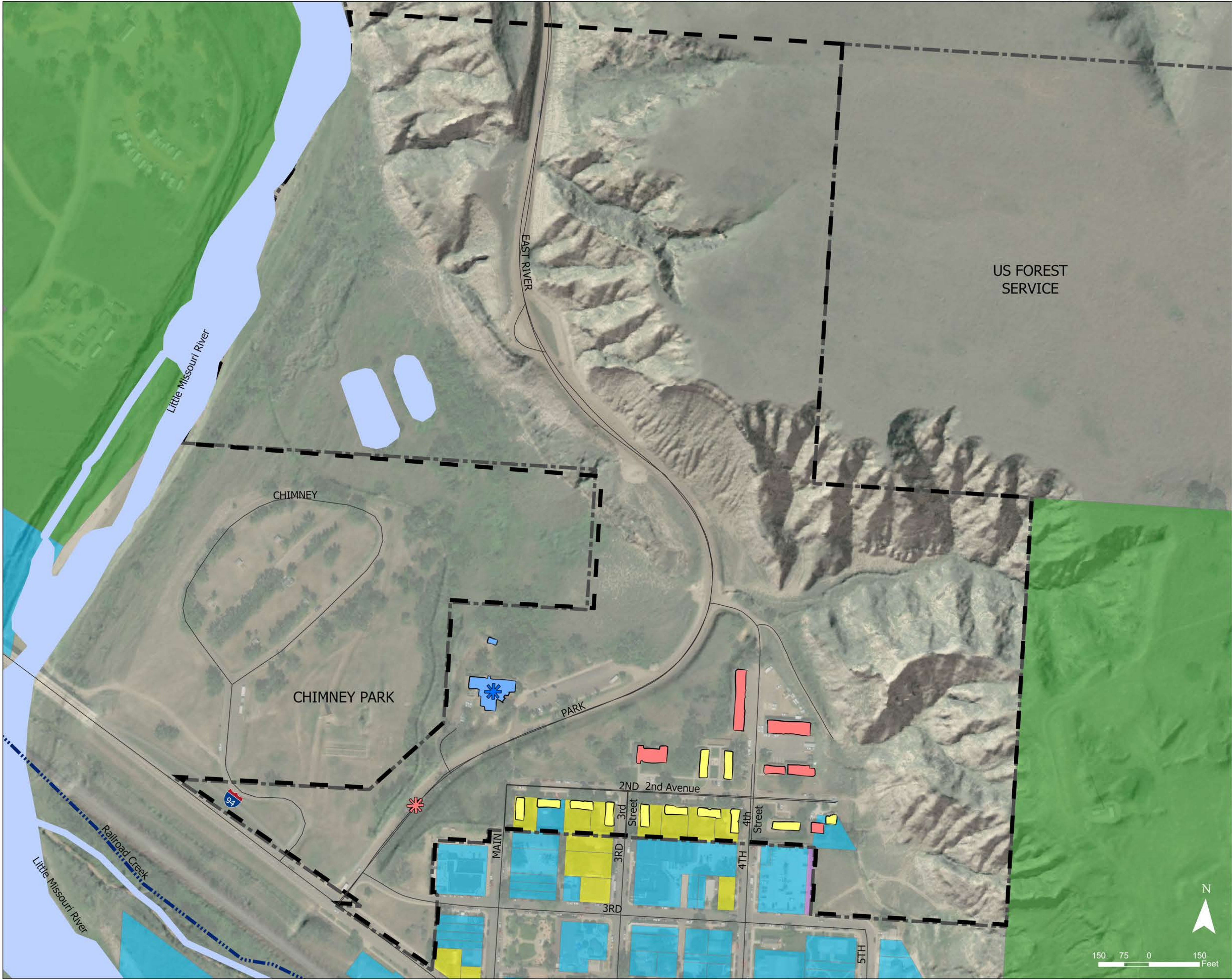
- NPS Buildings

Study Area Soils

- Badland, 9 to 150 percent slopes
- Badland-Arikara-Cabbart complex, 15 to 70 percent slopes
- Cabbart-Badland complex, 6 to 70 percent slopes
- Cabbart-Kremlin-Boxwell loams, 9 to 40 percent slopes, slumped
- Hanly fine sandy loam, 0 to 6 percent slopes, occasionally flooded
- Havre silt loam, 0 to 2 percent slopes, occasionally flooded
- Littlemo-Chanta complex, 0 to 2 percent slopes
- Patent loam, 0 to 6 percent slopes, occasionally flooded
- Patent-Badland-Cabbart complex, 6 to 50 percent slopes
- Tinsley-Chanta complex, 6 to 35 percent slopes
- Water



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Legend

NPS Visitor Facilities

- Visitor Center
- Entry Station

NPS Building Primary Function

- Housing
- Operations
- Visitor Services

Roads

Hydrology

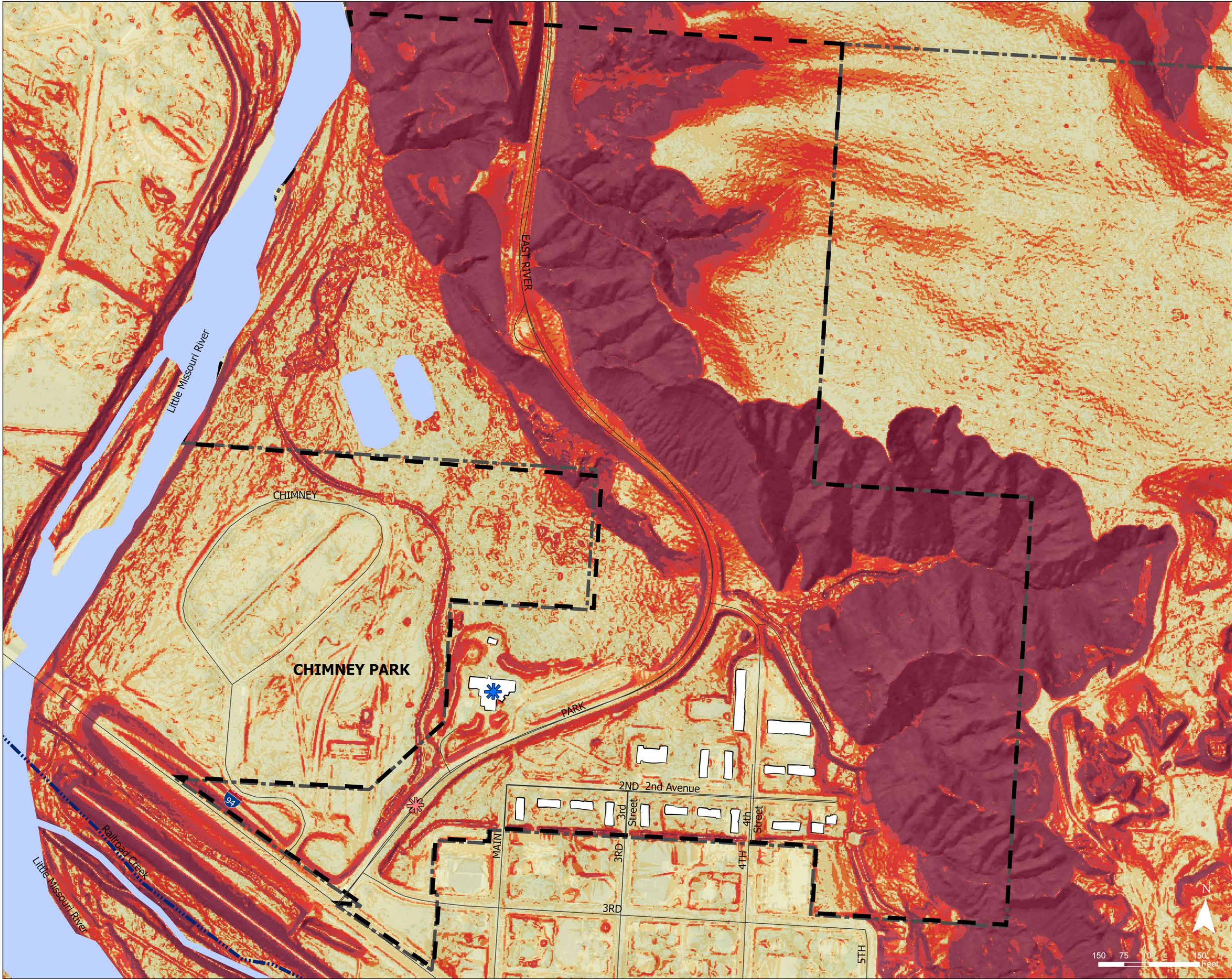
- Intermittent
- Rivers, Streams & Wetlands

Boundaries

- Study Area Boundary
- THRO Administrative Boundary

Parcels

- Unknown
- Commercial
- Farm
- RIVER BOTTOM
- RIVER BOTTOM EXEMPT
- Residential



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Legend

NPS Visitor Facilities

- Visitor Center
- Entry Station

NPS Buildings

- NPS Buildings

Roads

Hydrology

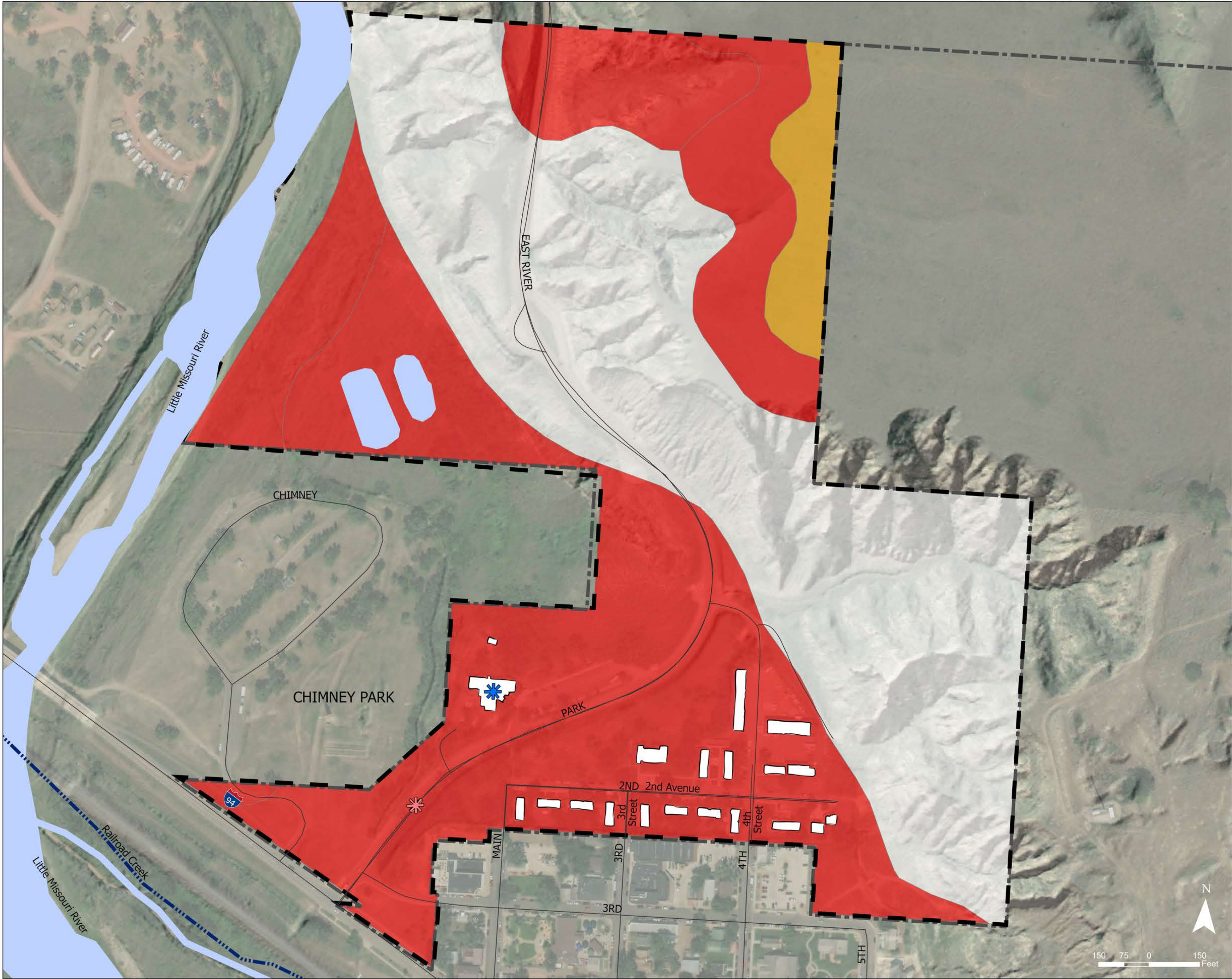
- Intermittent
- Rivers, Streams & Wetlands

Boundaries

- Study Area Boundary
- THRO Administrative Boundary

Slope Analysis

- 0-2%
- 2-5%
- 5-8%
- 8-15%
- 15-25%
- 25%+



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Legend

NPS Visitor Facilities

- Visitor Center
- Entry Station

Roads

Hydrology

- Intermittent
- Rivers, Streams & Wetlands

Boundaries

- Study Area Boundary
- THRO Administrative Boundary

NPS Buildings

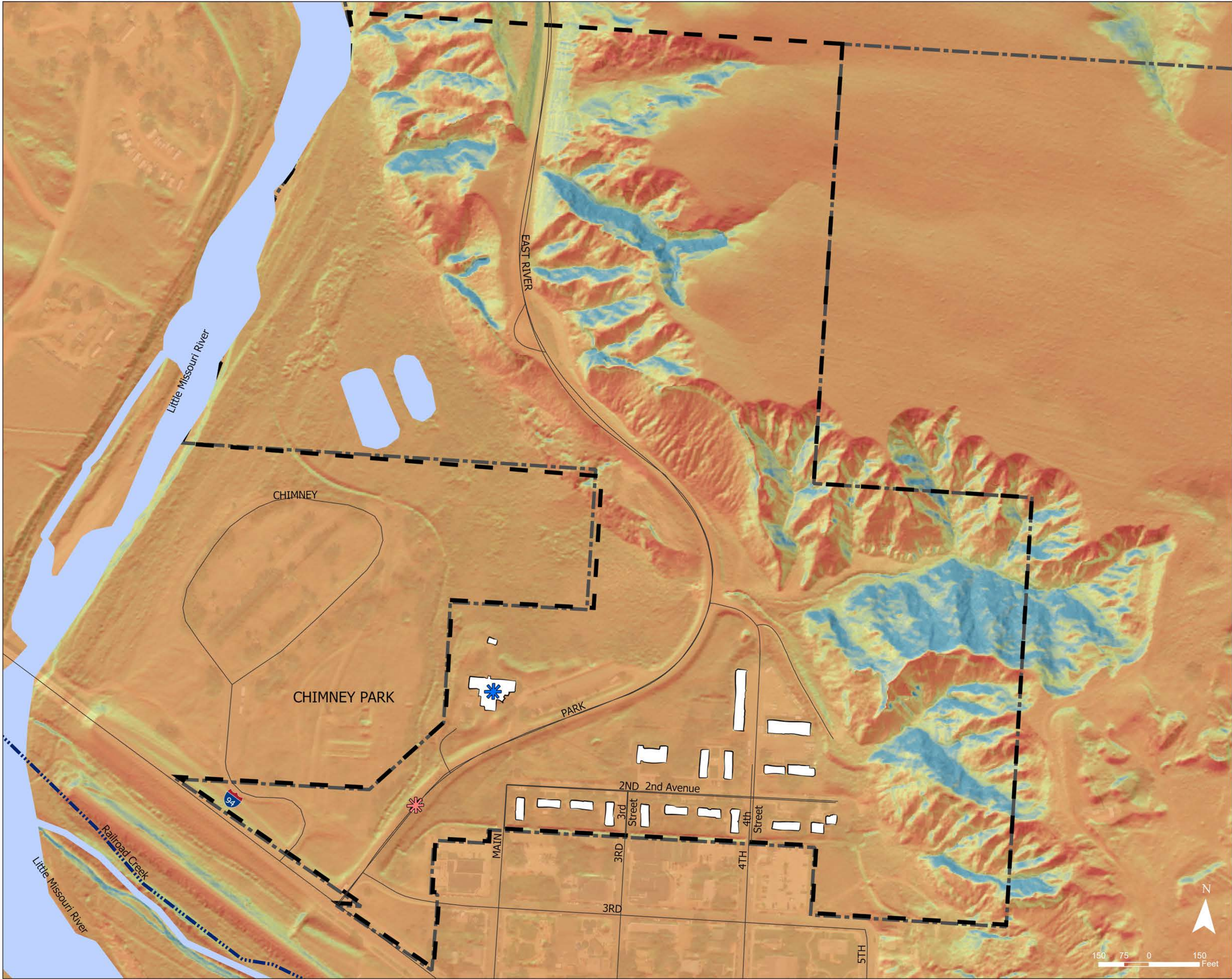
- NPS Buildings

Soil Quality for Development

- Not Rated
- Somewhat Limited
- Very Limited



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Legend

NPS Visitor Facilities

- Visitor Center
- Entry Station

NPS Buildings

- NPS Buildings

Roads

Hydrology

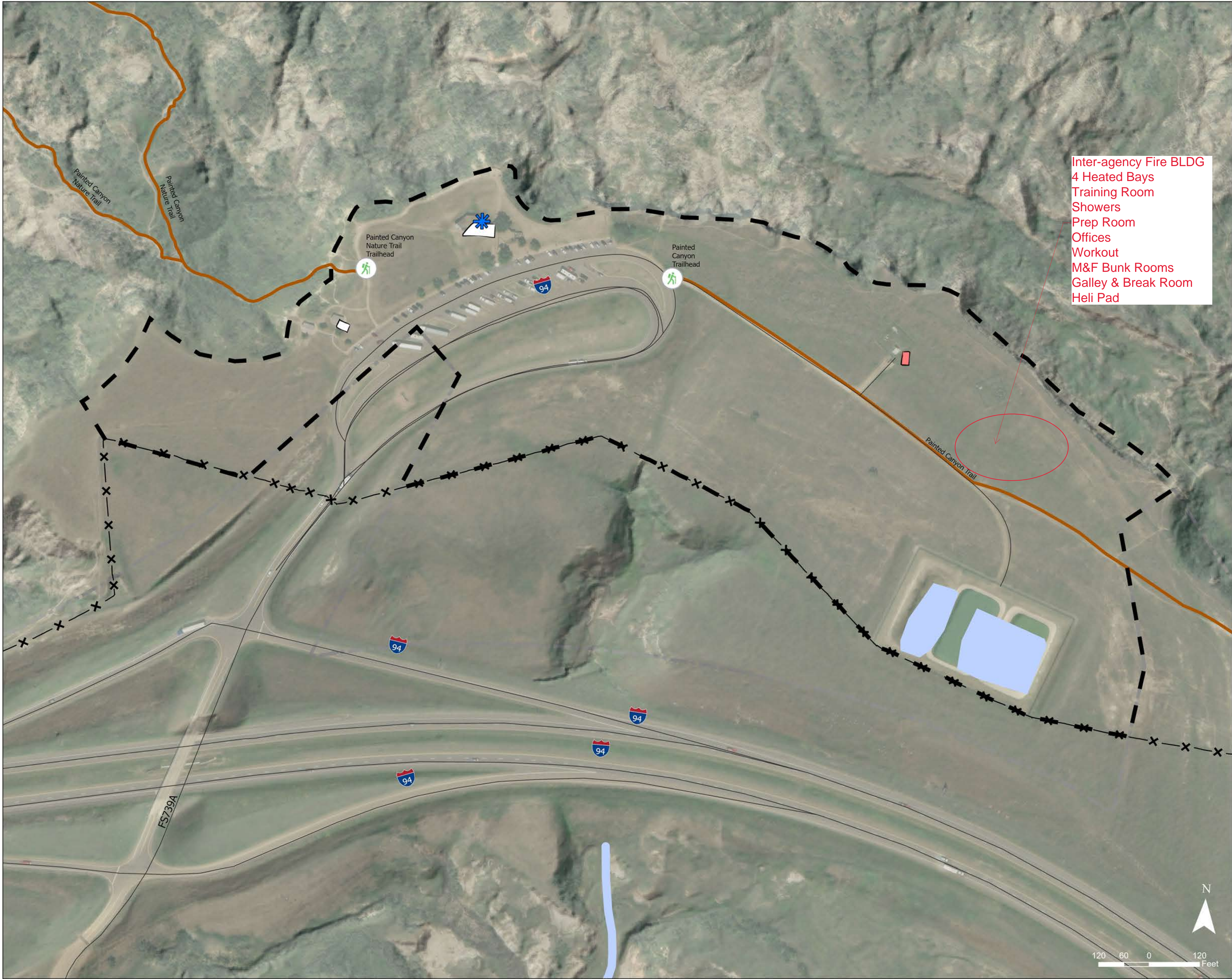
- Intermittent
- Rivers, Streams & Wetlands

Boundaries

- Study Area Boundary
- THRO Administrative Boundary

Solar Radiation Potential

- Highest Solar Potential
- Lowest Solar Potential



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Legend

NPS Visitor Facilities



Trailheads



Fence



NPS Building Primary Function



NPS Buildings



Roads



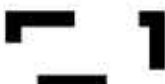
Non-Motorized Trail



Hydrology

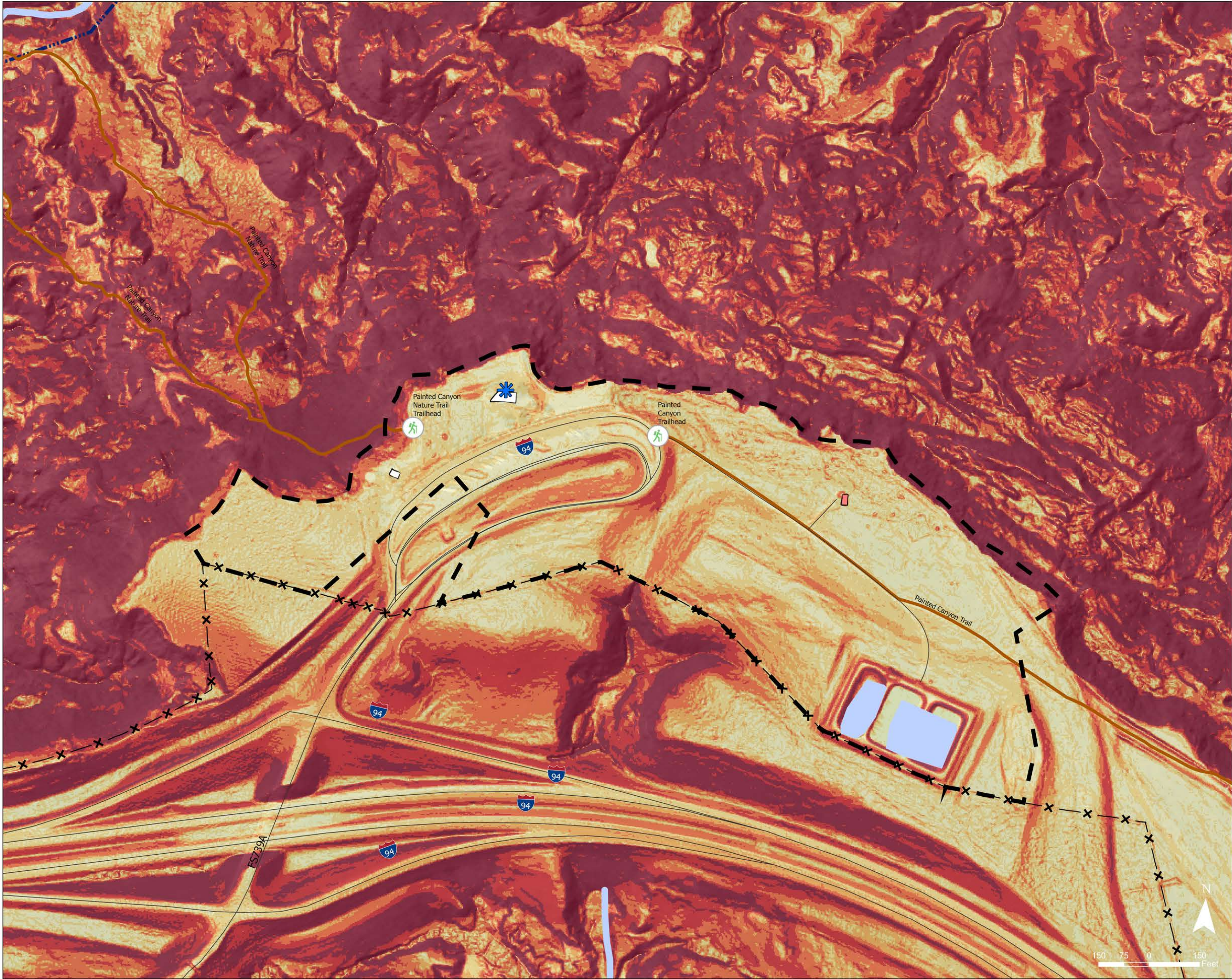


Boundaries



Study Area Boundary

THRO Administrative Boundary



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Legend

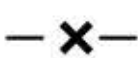
NPS Visitor Facilities



Trailheads



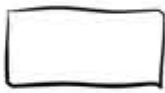
Fence



NPS Building Primary Function



NPS Buildings



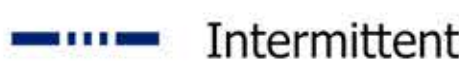
Roads



Non-Motorized Trail



Hydrology



Rivers, Streams and Wetlands



Slope

0-2%

2-5%

5-8%

8-15%

15-25%

25%+

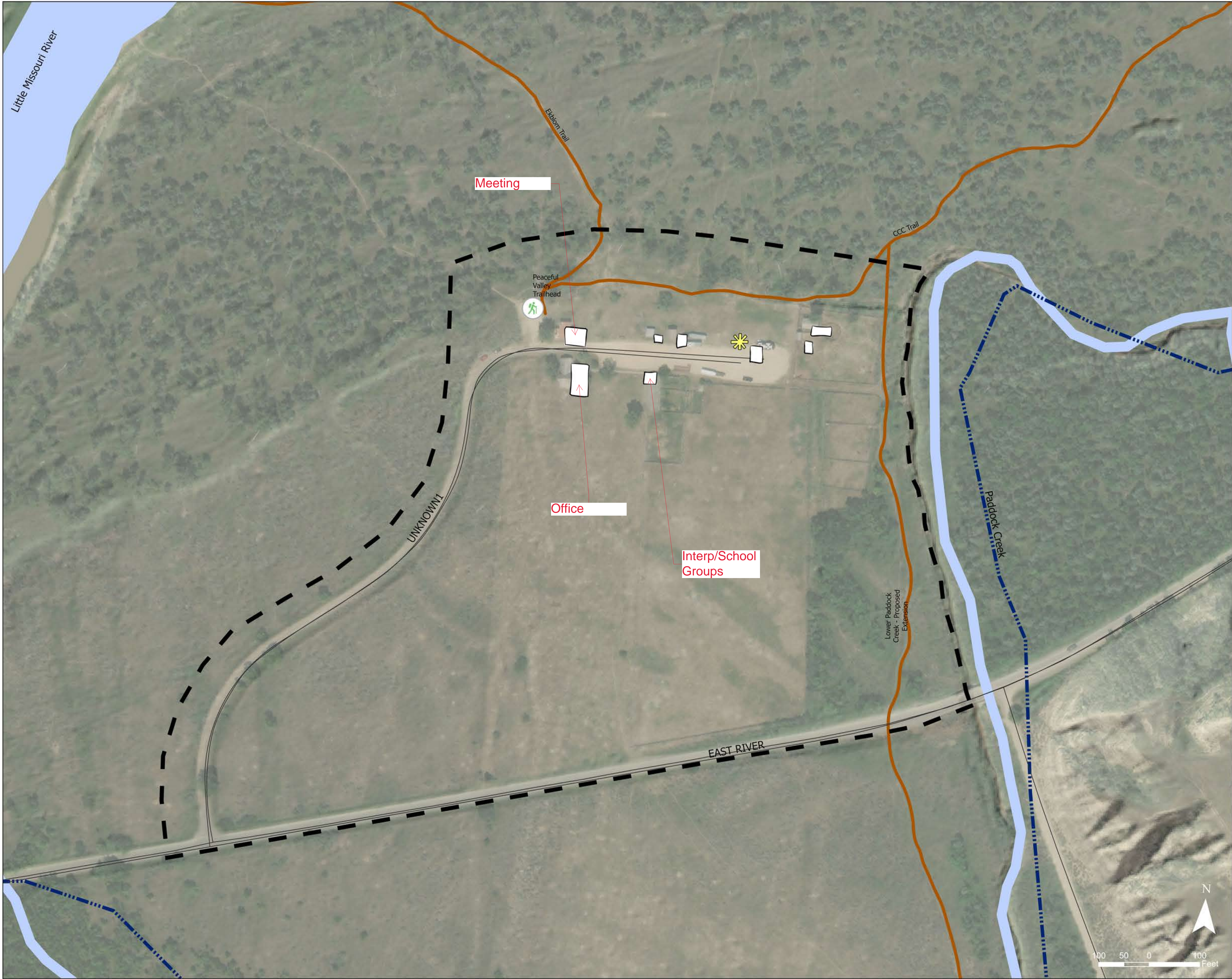
Boundaries



Study Area Boundary



THRO Administrative Boundary



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Legend

NPS Visitor Facilities



Restroom

Trailheads



NPS Buildings



NPS Buildings

Roads



Hydrology



Intermittent



Rivers, Streams and Wetlands

Non-Motorized Trails



Non-Motorized Trails

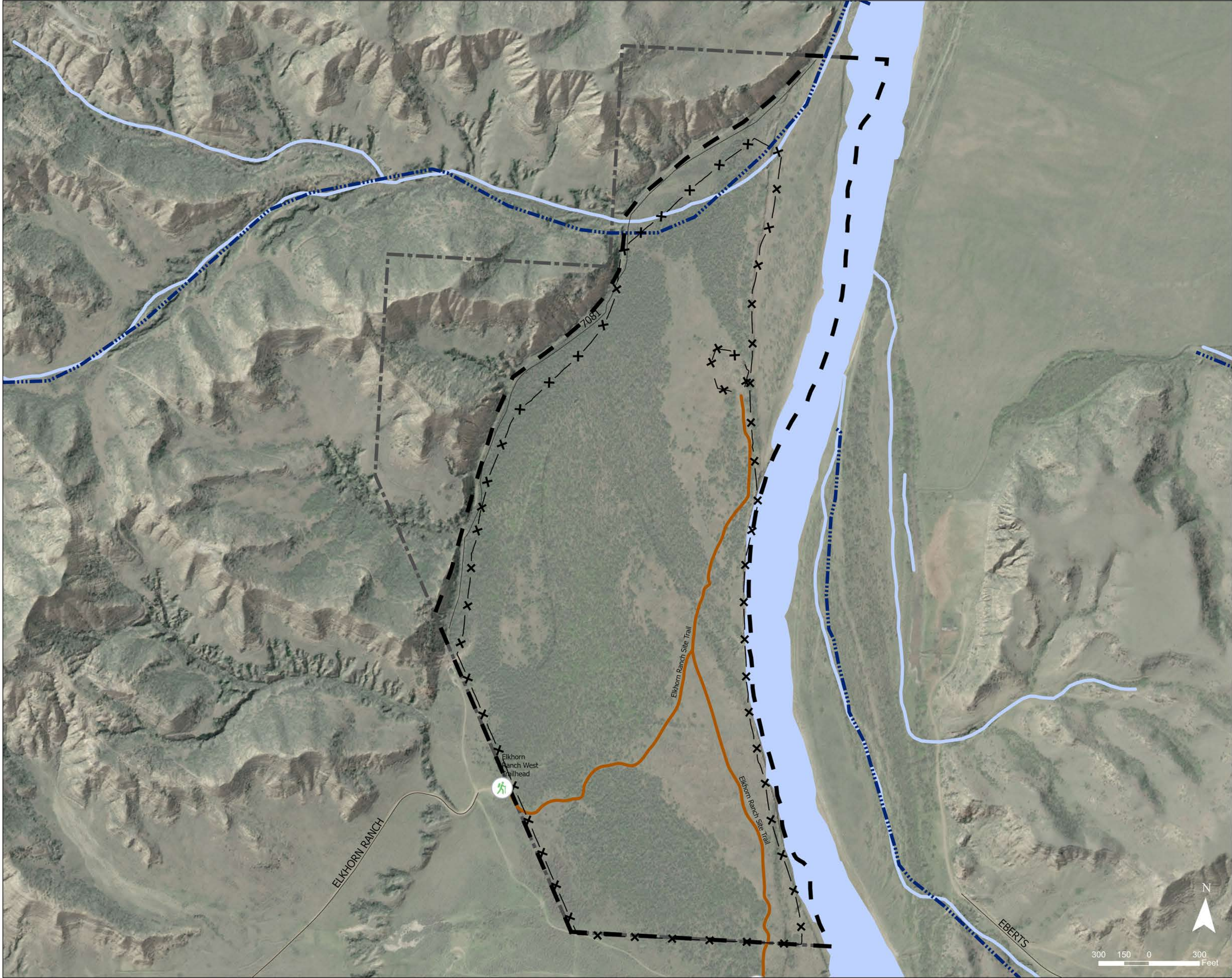
Boundaries



Study Area Boundary



THRO Administrative Boundary



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Legend

Trailheads



Fence



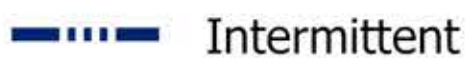
NPS Buildings



Roads



Hydrology



Intermittent

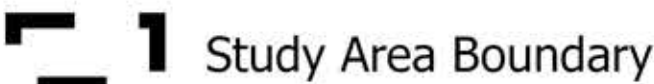


Rivers, Streams and Wetlands

Non-Motorized Trails



Boundaries



Study Area Boundary



THRO Administrative Boundary



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Legend

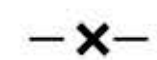
NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines



Fence



NPS Buildings - Temp



Roads



Hydrology

- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

- Study Area Boundary
- THRO Admin Boundary



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Legend

NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines

-

Fence

- x -

NPS Buildings - Temp

-

Roads

-

Hydrology

- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

- Study Area Boundary
- THRO Admin Boundary



Comprehensive Site Plan and
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Legend

NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines

-

Fence

-

NPS Buildings - Temp

-

Roads

-

Hydrology

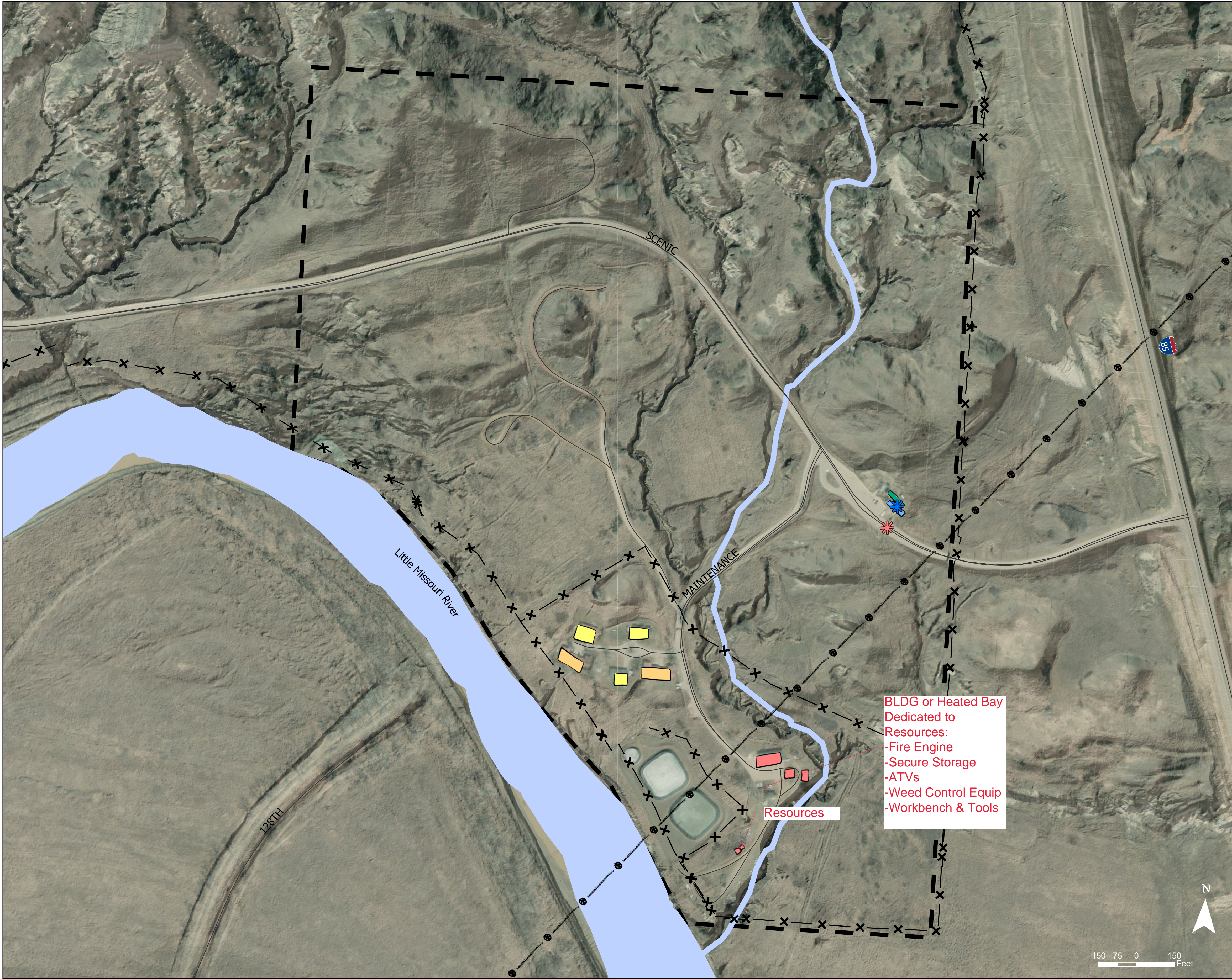
- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

- Study Area Boundary
- THRO Admin Boundary



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Legend
NPS Visitor Facilities selection
Facility Type

- Entry Station
- Visitor Center

Transmission Lines

Fence

NPS Buildings - Temp (Full)

- Housing (Duplex)
- Housing (Single Family)
- Operations
- Operations (Office)
- Visitor Services

Roads

Hydrology

- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

- Study Area Boundary
- THRO Admin Boundary



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Legend

NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines

Fence

NPS Buildings - Temp

Roads

Hydrology

- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

- Study Area Boundary
- THRO Admin Boundary

Vegetation Mapping (1996)

- Agriculture Area
- Developed Area
- Forbland
- Grassland
- Invasive Species
- Other/Unknown
- Shrubland
- Sparse Vegetation
- Water
- Wetland
- Woodland



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Legend

NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines

Fence

NPS Buildings - Temp

Roads

Hydrology

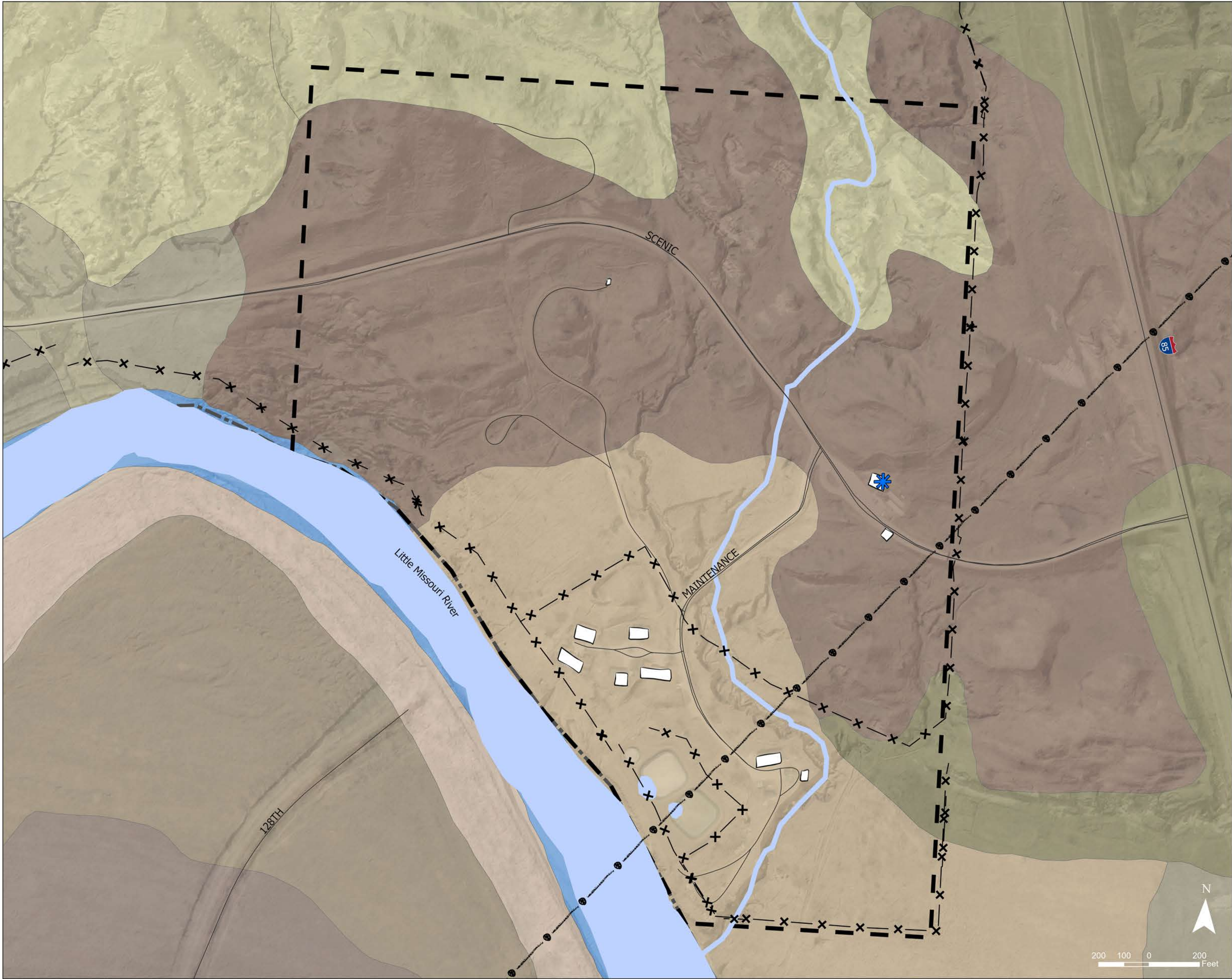
- Intermittent
- Rivers, Streams, and Wetlands

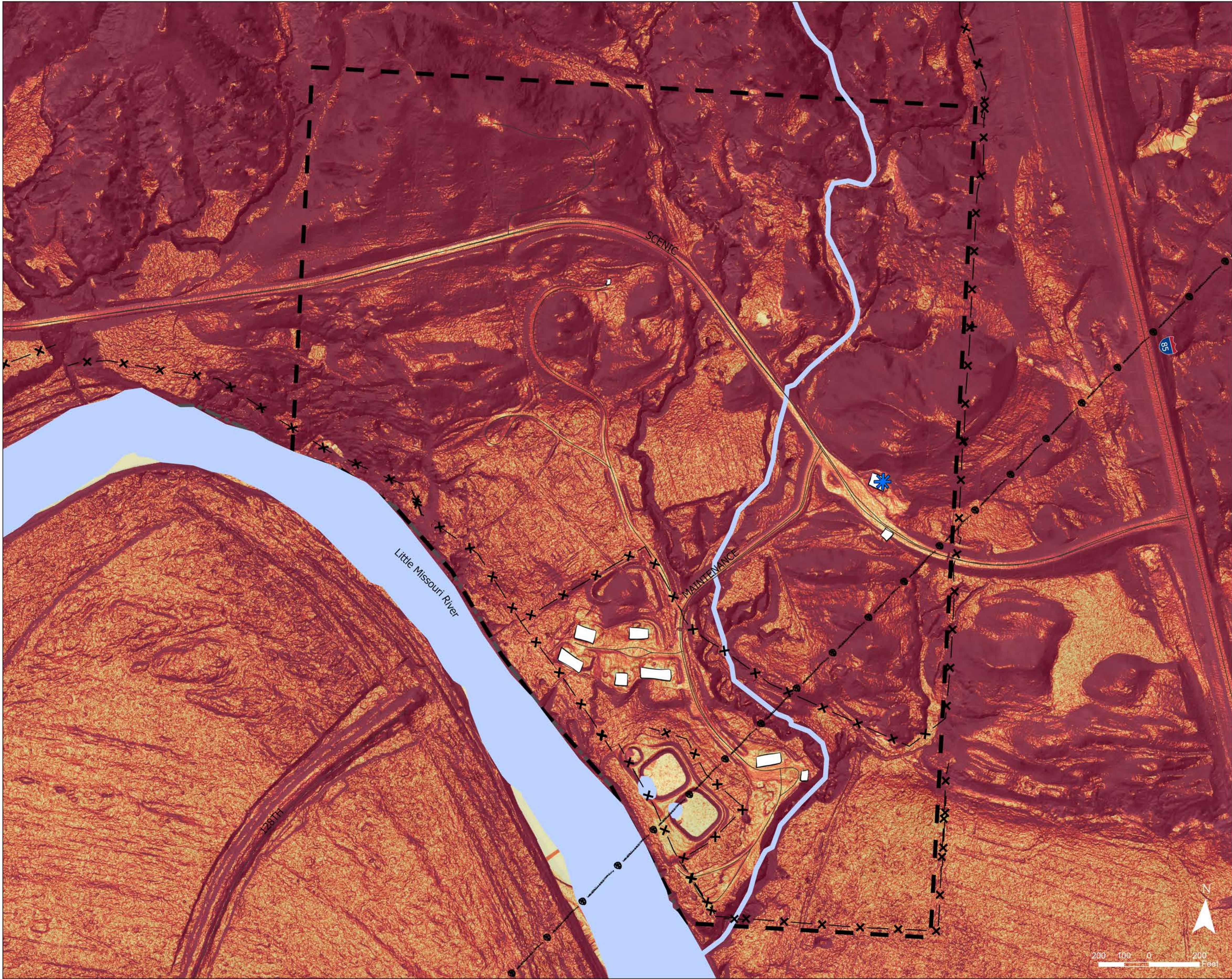
Boundaries

- Study Area Boundary
- THRO Admin Boundary

Mapunit Name

- Badland-Arikara-Cabbart complex, 15 - 70% slopes
- Badland-Cabbart complex, 6 - 70% slopes
- Cabbart-Badland complex, 6 - 70% slopes
- Cabbart-Kremlin-Boxwell loams, 9 - 40% slopes, slumped
- Glendive fine sandy loam, 0 - 2% slopes, occasionally flooded
- Hanly fine sandy loam, 0 - 6% slopes, occasionally flooded
- Hanly fine sandy loam, wooded, 0 - 6% slopes, occasionally flooded
- Patent loam, 0 - 6% slopes, occasionally flooded
- Patent, Vanda-Gerda, barren complex, 0 - 9% slopes
- Patent-Patent, occasionally flooded-Glendive, 0 - 9% slopes
- Water
- Wolf Point silty clay loam, 0 - 2% slopes, occasionally flooded





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Legend

NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines

Fence

NPS Buildings - Temp

Roads

Hydrology

- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

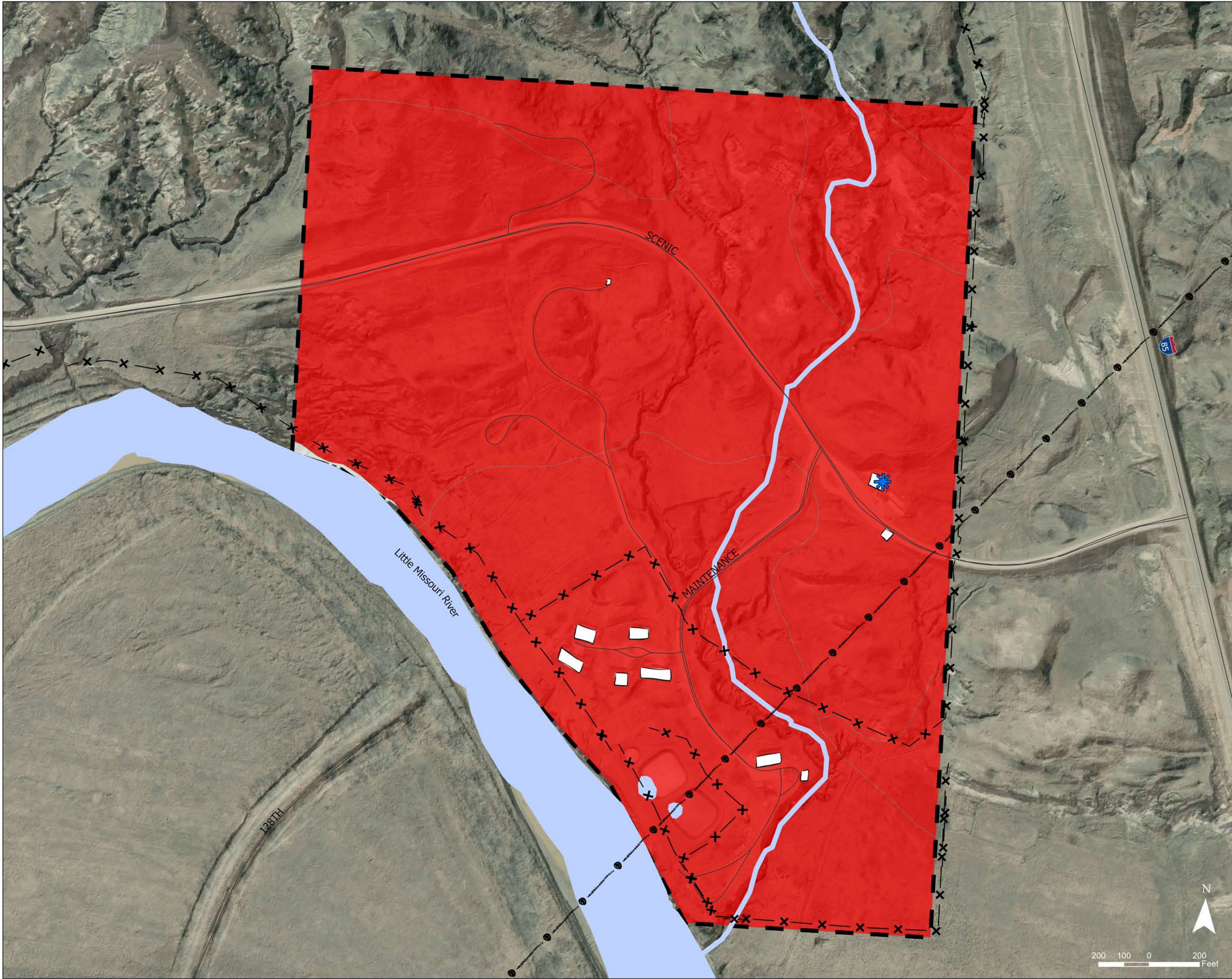
- Study Area Boundary
- THRO Admin Boundary

Slope Analysis

- 0-2%
- 2-5%
- 5-8%
- 8-15%
- 15-25%
- 25%+



Comprehensive Site Plan and
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Legend

NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines

Fence

NPS Buildings - Temp

Roads

Hydrology

- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

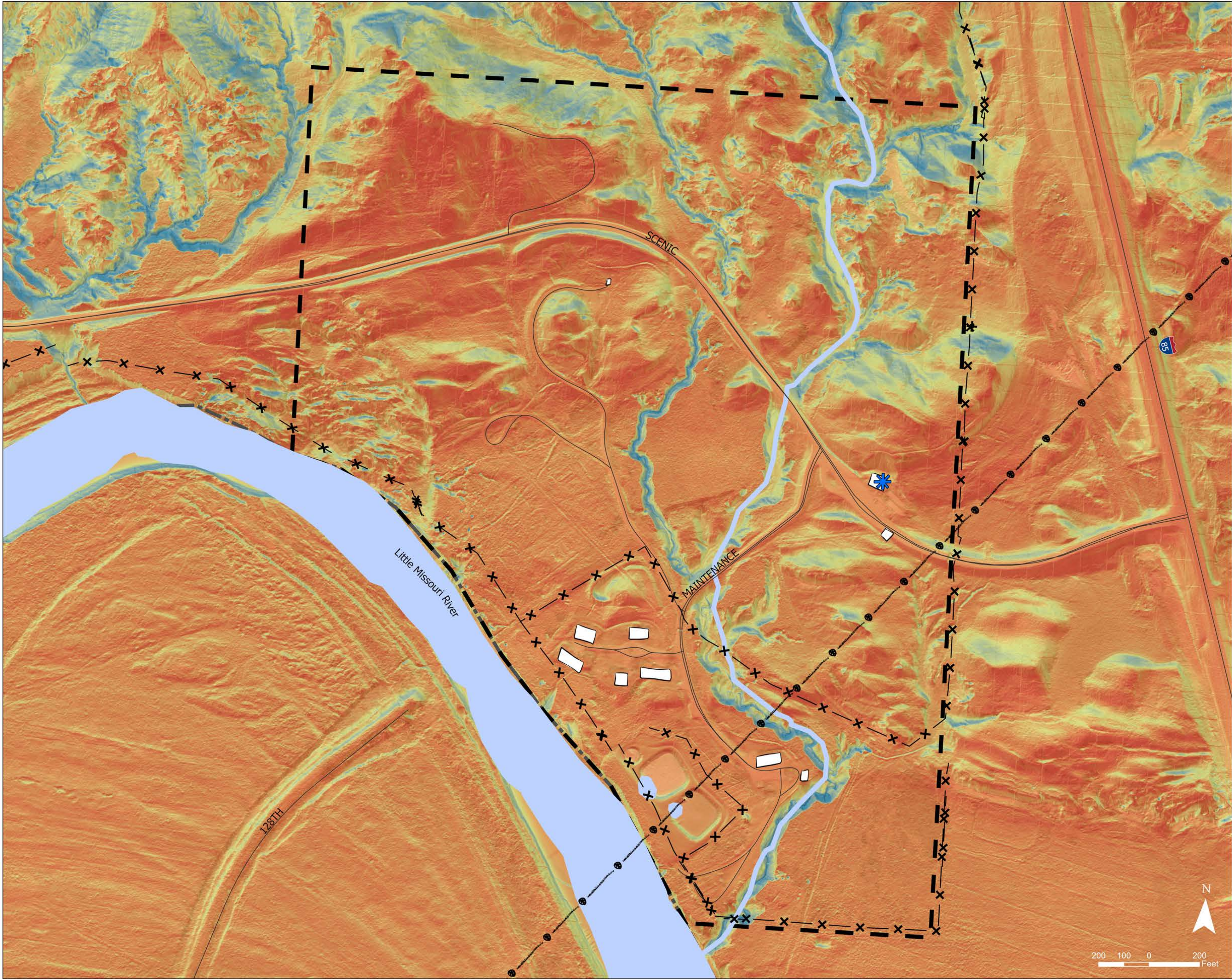
- Study Area Boundary
- THRO Admin Boundary

Soil Quality for Development - North Area

- Not Rated
- Very Limited



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THRO 258662



Legend

NPS Visitor Facilities

- Campground
- Visitor Center

Transmission Lines

Fence

NPS Buildings - Temp

Roads

Hydrology

- Intermittent
- Rivers, Streams, and Wetlands

Boundaries

- Study Area Boundary
- THRO Admin Boundary

Solar Radiation Potential

- Highest Solar Potential
- Lowest Solar Potential



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Legend

NPS Visitor Facilities



Campground

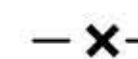


Visitor Center

Transmission Lines



Fence



NPS Buildings - Temp



Roads



- Viewshed Analysis Corridor - North Unit

Hydrology



Intermittent

Rivers, Streams, and Wetlands

Boundaries



Study Area Boundary



THRO Admin Boundary

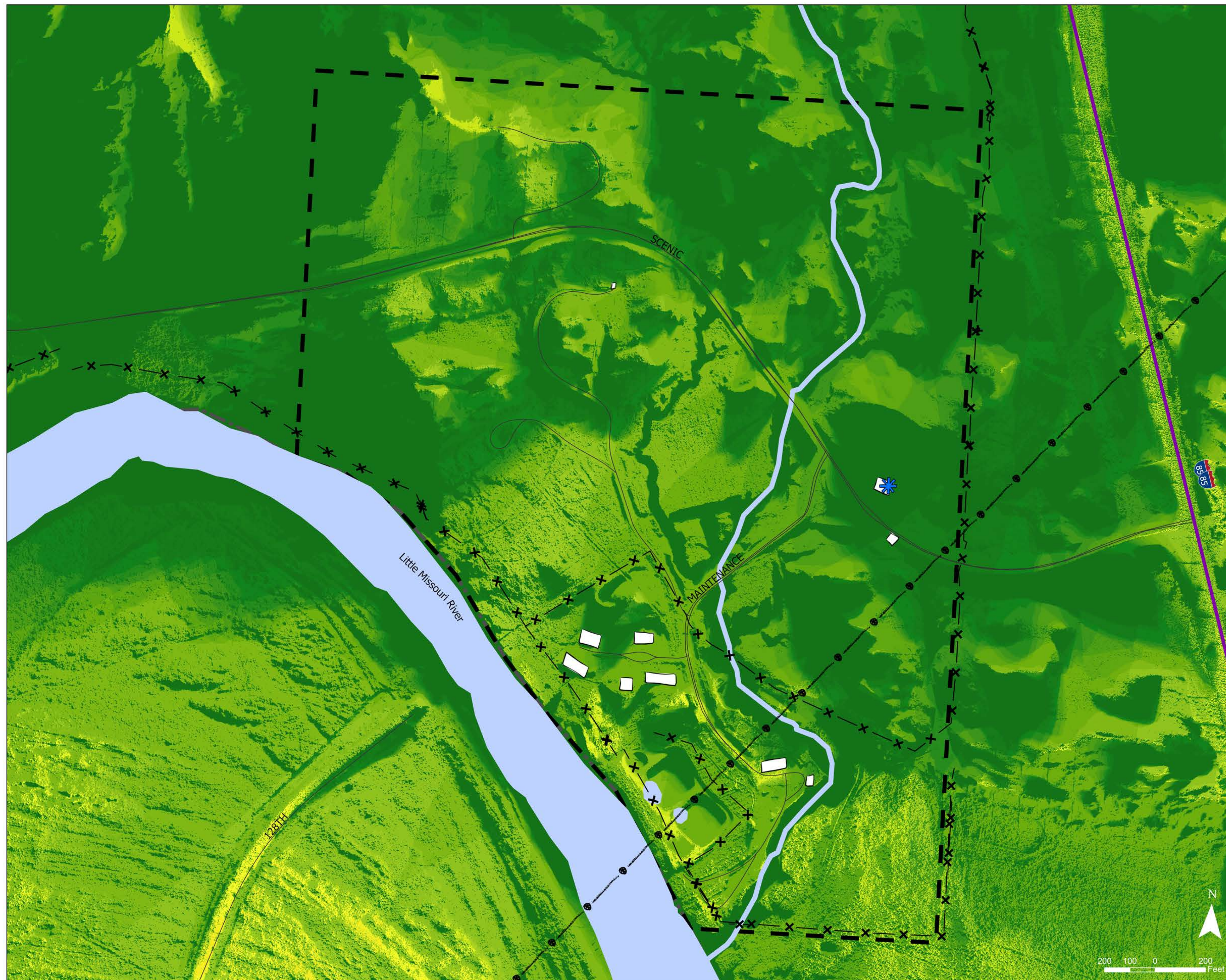
Viewshed



Most Visible



Least Visible



APPENDIX C

WETLANDS STUDY

APPENDIX E

Wetlands Study



Wetland Delineation Report

**Theodore Roosevelt National Park
Comprehensive Site Plan and Environmental Assessment
PMIS #258662**



Prepared for:

**National Park Service
Denver Service Center
12795 West Alameda Parkway
Denver, CO 25287**

Prepared by:

**Otak, Inc.
2828 Colby Avenue, Suite 401
Everett, WA 98201
Otak Project No. 33194**

October 15, 2020

Executive Summary

This Wetland Delineation Report has been prepared for the National Park Service (NPS) for the Comprehensive Site Plan and Environmental Assessment project at Theodore Roosevelt National Park in Billings and McKenzie Counties, North Dakota. The NPS is preparing a comprehensive site plan to improve the visitor experience, address facility concerns and deferred maintenance, and guide refined development proposals for the South Unit and North Unit park entrance areas. Site plans will be evaluated in subsequent National Environmental Policy Act (NEPA) documents. NPS contracted with Otak, Inc. (Otak) to survey the project study areas in the North and South Units for wetlands and other waters of the United States (WOTUS) for compliance with NEPA, the Clean Water Act (CWA), and NPS *Director's Order (DO) #77-1: Wetland Protection*. Wetland functions have also been assessed to help evaluate potential impacts on wetlands from different design alternatives

Theodore Roosevelt National Park is situated in the Badlands of southwest North Dakota along the Little Missouri River. The study area for this report includes portions of the South Unit near the City of Medora in Billings County and the North Unit near Watford City in McKenzie County. The North Unit study area is located in Section 35 of Township 148 North, Range 099 West of the Public Land Survey System, and the South Unit study area is located in Sections 22, 23, 26 and 27 of Township 140 North, Range 102 West. Both study areas abut the Little Missouri River. The North Unit study area is approximately 159 acres in size, and the South Unit study area is approximately 96 acres in size.

Wetland and stream boundaries were delineated in the field by an Otak biologist on July 20, 21, and 22, 2020. Study areas were traversed on foot using curvy-linear transects that focused on landscape position and changes in vegetation. In accordance with federal USACE and NPS guidance and regulations, wetlands and other WOTUS were delineated in the field using the three-parameter approach detailed in the Corps of Engineers Wetlands Delineation Manual (USACE 1987), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE 2010). In addition, NPS *Procedural Manual #77-1: Wetland Protection* (NPS 2016) requires that all wetlands, including artificial wetlands (e.g., excavated ponds), be mapped without regard to regulatory jurisdiction due to periodic changes in the types of wetlands that fall under CWA jurisdiction. Wetlands were classified according to the Federal Geographic Data Committee (FGDC) Wetlands Classification Standard (FGDC 2013), commonly known as the Cowardin classification system, (Cowardin et al, 1979), and the hydrogeomorphic (HGM) classification system (Brinson 1993).

Eight wetlands and three watercourses were identified and delineated in the North Unit study area. Three wetlands and five watercourses were identified and delineated in the South Unit study. Cowardin habitat classes predominantly included palustrine emergent wetlands, and wetland HGM classes included slope and depressional. Primary functions provided by the wetlands included moderation of groundwater flow, velocity reduction of surface water flow, flood storage, retention of particulates and pollutants for maintaining water quality, organic carbon export, and habitat diversity and connectivity in the semi-arid landscape. Mapped wetlands included natural features and artificial wetland habitats constructed for treating stormwater. Wetlands and watercourses in the study area are potentially regulated by the USACE under the CWA. The definition of WOTUS was recently updated on June 22, 2020 under the Navigable Waters Protection Rule. Jurisdictional assessments according to this new rule are included for all wetlands and watercourses delineated in the North Unit and South Unit study areas.

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Acronyms and Abbreviations

CFR	Code of Federal Regulations
CWA	Clean Water Act
DO	Director's Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAC	Facultative
FACW	Facultative wetland
FACU	Facultative upland
FGDC	Federal Geographic Data Committee
GIS	Geographic Information Systems
GPS	Global Positioning System
HGM	Hydrogeomorphic
NEPA	National Environmental Policy Act
NL	Not Listed
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate
OHWM	Ordinary high water mark
PEM	Palustrine emergent
PFO	Palustrine forested
PSS	Palustrine scrub shrub
TNW	Traditional Navigable Water
UPL	Upland
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOTUS	Waters of the United States

Chapter 1. Introduction

This Wetland Delineation Report has been prepared for the National Park Service (NPS) for the Comprehensive Site Plan and Environmental Assessment project at Theodore Roosevelt National Park in Billings and McKenzie Counties, North Dakota. The NPS is preparing a comprehensive site plan to improve the visitor experience, address facility concerns and deferred maintenance, and guide refined development proposals for the South Unit and North Unit park entrance areas. Site plans will be evaluated in subsequent National Environmental Policy Act (NEPA) documents. NPS contracted with Otak, Inc. (Otak) to survey the project study areas in the North and South Units for wetlands and other waters of the United States (WOTUS) for compliance with NEPA, the Clean Water Act (CWA), and NPS *Director's Order (DO) #77-1: Wetland Protection*. Wetland functions have also been assessed to help evaluate potential impacts on wetlands from different design alternatives.

The methods and tools used to prepare this report are provided in Appendix A. Background information and report figures are provided in Appendix B, and wetland determination data forms are provided in Appendix C.

1.1 Project Location and Landscape Setting

Theodore Roosevelt National Park is situated in the Badlands of southwest North Dakota along the Little Missouri River. The study area for this report includes portions of the South Unit near the City of Medora in Billings County and the North Unit near Watford City in McKenzie County (Appendix B – Figure 1 – Locations Map). The study areas within each park unit are shown on Figures 2 through 7 in Appendix C. The North Unit study area is located in Section 35 of Township 148 North, Range 099 West of the Public Land Survey System, and the South Unit study area is located in Sections 22, 23, 26 and 27 of Township 140 North, Range 102 West. Both study areas abut the Little Missouri River. The North Unit study area is approximately 159 acres in size, and the South Unit study area is approximately 96 acres in size.

The South Unit study area includes a portion of the City of Medora, NPS maintenance facilities, employee housing, and offices, and the South Unit Visitor Center and parking lot. East River Road is generally aligned north and south through the center of the study area. The west side of the study area is within the mapped 100-year floodplain of the Little Missouri River. Riparian woodlands are located in the floodplain of the Little Missouri River west of East River Road. Two decommissioned sewage lagoons were previously located west of East River Road in the floodplain, and have since been revegetated and restored within the landscape. Culverts under East River Road allow surface water to flow west toward the Little Missouri River. Floodgates have been installed on the culvert outlets west of East River Road to prevent floodwater from the Little Missouri River reaching the City of Medora and NPS facilities east of the road.

The North Unit study area includes NPS maintenance facilities, employee housing, two sewage lagoons, North Unit Visitor Center and parking area, and a well house. Scenic Drive is aligned east and west through the center of the North Unit study area, and Maintenance Way is aligned north to south and provides access to the employee housing and maintenance areas. A gravel road provides access to the well house northwest of the employee housing. Several culverts Barbed wire fences are located along the southern and eastern edges of the study area that align with the NPS property boundary.

The badlands landscape includes areas around the Little Missouri River that have formed by erosion and collapse of the soft silt or clay soils following lignite coal bed burnings. Badly eroded clay-scoria slopes, buttes and steep canyons are common throughout the badlands landscape, and ephemeral and intermittent streams are common in steep valleys. The landscape includes abrupt changes in substrate, slope, soils and salinity that result in a fragmented collection of habitats supporting a patchwork of plant communities. The climate of southwestern North Dakota is characterized by long, cold winters; short, hot summers; low rainfall and low humidity. Annual precipitation averages 15-16 inches, which mostly falls during the growing season. Daytime temperatures over 100 degrees Fahrenheit are common during the summer months, and winter low temperatures occasionally exceed -40 degrees Fahrenheit (NDGFD 2020, Godfred 1994).

Chapter 2. Methods

This chapter summarizes the methods used in accordance with federal guidance in delineating wetland and stream boundaries in North Dakota for the study areas in the North and South Units. See Table A-1 in Appendix A for references and further details regarding the methods used to produce this report.

2.1 Review of Available Published Information

Available published information was reviewed prior to the field investigation to identify any previously documented wetlands, streams, or other pertinent site characteristics (e.g., vegetation community patterns, topography, soils, or water courses) that would indicate the presence of wetlands and streams within the study areas. These maps are typically used as guidance, and do not supersede conditions in the field. As part of this effort Otak biologists reviewed the following sources:

- National Wetlands Inventory (NWI) map (USFWS 2020);
- Soil survey from the United States Natural Resources Conservation Service (NRCS) (NRCS 2020).

Appendix B includes figures associated with the background review, including: NWI maps (Figures 2 and 3) and USGS topography maps (Figures 4 and 5).

North Unit

NWI maps one linear riverine habitat flowing north to south and transitioning to a linear freshwater emergent wetland that crosses Scenic Drive and Maintenance Way before discharging to Little Missouri River. Little Missouri River is mapped as riverine habitat. Two excavated freshwater ponds are mapped near the southern study area boundary where the two sewage lagoons are located. No other wetlands are mapped by NWI within the study area. Seven different soil units are mapped within the North Unit study area, but they are not listed as hydric.

Table 2-1— North Unit: NRCS Soil Units

Mapped Soil Unit	Slope %	Drainage Class	Landform	Parent Material	Hydric?
Cabbart-Kremlin Boxwell loams	9-40, slumped	Well drained	Ridges	Loamy residuum weathered from siltstone and mudstone	No
Badland-Cabbart complex	6-70	Well drained	Hillslopes	Shale and siltstone	No
Cabbart-Badland complex	6-70	Well drained	Hillslopes	Residuum weathered from calcareous siltstone	No
Badland-Arikara- Cabbart complex	15-70	Well drained	Hillslopes	Shale and siltstone	No
Patent loam	0-6	Well drained, occasionally flooded	Alluvial fans	Fine-loamy alluvium	No
Glendive fine sandy loam	0-2	Moderately well drained, occasionally flooded	Flood-plain steps	Coarse-loamy alluvium derived from sedimentary rock	No
Hanly fine sandy loam	0-6	Moderately well drained, occasionally flooded	Flood-plain steps	Stratified sandy alluvium derived from sedimentary rock	No

South Unit

NWI maps two excavated freshwater emergent wetlands within a large field east of East River Road where the decommissioned sewage lagoons were located. These artificial features were originally mapped in 1983 and are no longer present in the landscape after they were decommissioned. Little Missouri River is mapped as riverine habitat. No other wetland habitats are mapped by NWI within the study area. Six different soil units are mapped within the South Unit study area, but they are not listed as hydric.

Table 2-2— South Unit: NRCS Soil Units

Mapped Soil Unit	Slope %	Drainage Class	Landform	Parent Material	Hydric?
Patent-Badland-Cabbart complex	6-50	Well drained	Alluvial fans	Slope alluvium derived from sandstone and siltstone	No
Badland	9-150	No drainage class listed. Runoff class listed as High.	Hillslopes	Shale and siltstone	No
Havre silt loam	0-2	Well drained	Flood-plain steps	Fine-loamy alluvium derived from sedimentary rock	No
Hanly fine sandy loam	0-6	Moderately well drained	Flood-plain steps	Stratified sandy alluvium derived from sedimentary rock	No
Littlemo-Chanta complex	0-2	Well drained	Paleoterraces	Fine-loamy alluvium	No
Tinsley-Chanta complex	6-35	Excessively drained	Escarments on paleoterraces	Sandy and gravelly alluvium	No

2.2 Precipitation Data and Analysis

2.2.1 Evaluation of the Growing Season

Wetland hydrologic conditions are considered present if soils are inundated or saturated to the surface continuously for at least 5 percent of the growing season in most years (50 percent probability of recurrence) (USACE 1987). The technical standard for disturbed or problematic sites requires 14 or more consecutive days of flooding or ponding, or a water table 12 inches or less below the soil surface, during the growing season, at a minimum frequency of 5 years in 10 (National Research Council 1995).

The beginning and ending dates of the growing season can be defined based on two indicators of biological activity that are readily observable in the field: (1) above ground growth and development of vascular plants, and (2) soil temperature. However, due to seasonal fluctuations from year to year the growing season dates may also be approximated by the number of frost-free days, defined as the time from the last date in spring when the ambient air temperature drops to 28°F, to the first date in fall when it drops to 28°F, over a 30-year period (USACE 2010).

As such, the beginning and ending dates for the growing season for the project site were estimated from long-term weather records (1979-2019) as the median dates (50 percent probability) for the first and last 28°F days at the Waterford City 14S climate station. The Waterford City 14S climate station is the closest representative station between the North and South Units that have available WETS tables and long-term records. Based on long-term weather records the average start and end dates for the growing season for the area are May 9 and September

27, respectively, for a total growing season of 141 days (NRCS 2020a). Continuing wetland hydrologic conditions must be present for at least 7 consecutive days during the growing season for this site.

2.2.2 Precipitation Data during Field Investigation

The field survey for the project was conducted on July 20, 21, and 22, 2020. The area received 0.99 inches of precipitation in the two-week period (July 5 – July 19) prior to the field survey on July 20, 2020 as measured at the Grassy Butte 2ENE climate station. The Grassy Butte 2ENE climate station is the closest representative station between the North and South Units with available daily precipitation data (NRCS 2020a). Precipitation amounts for the three months preceding the field survey were normal in April 2020, normal in May 2020, and above normal in June 2020 (Table 2-2).

Table 2-3—Summary of Precipitation Data from April 1 to July 1, 2020

Category	April 2020	May 2020	June 2020
Recorded Precipitation (inches)	0.82	1.33	4.44
Precipitation Average	1.15	2.41	2.94
30-70% Normal Range (inches) from 1979-2019	0.56-1.39	1.21-2.95	2.02-3.51
Comparison to Normal Range	Normal	Normal	Above normal

Source: NRCS 2020a.

2.3 Field Investigation

Wetland and stream boundaries were delineated in the field by an Otak biologist on July 20, 21, and 22, 2020. The South Unit was surveyed on July 20, 2020 and the North Unit was surveyed on July 21 and 22, 2020. Study areas were traversed on foot using curvy-linear transects that focused on landscape position and changes in vegetation.

Wetlands, as regulated by the United States Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (USEPA) under the CWA, are defined at 33 Code of Federal Regulations (CFR) 328.3(c) – Definitions as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” *Ordinary high water mark* is defined as “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed upon the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” *NPS Procedural Manual #77-1: Wetland Protection* (NPS 2016) has a slightly broader definition of wetlands to include areas that may contain only one of the three parameters required per USACE guidance as long as wetland hydrology is present, such as along shorelines where wave action may scour vegetation and prevent hydric soil indicators from developing.

2.3.1 Wetlands

In accordance with federal USACE and NPS guidance and regulations, wetlands were delineated in the field using the three-parameter approach detailed in the Corps of Engineers Wetlands Delineation Manual (USACE 1987), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE 2010). Following routine methodology, data on vegetation, soils, and hydrology were collected at paired (upland/wetland) data points to document upland/wetland boundaries. The USACE wetland determination data forms for the data points are provided in Appendix C. In addition, *NPS Procedural Manual #77-1: Wetland Protection* (NPS 2016) requires that all wetlands, including artificial wetlands (e.g., excavated ponds), be mapped without regard to regulatory jurisdiction due to periodic changes in the types of wetlands that fall under CWA jurisdiction.

Vegetation

Representative upland and wetland vegetation communities were documented at each data point during the field survey. Typically, three vegetation strata are inventoried at each data point, including trees within a 30-foot diameter plot, shrubs within a 15-foot diameter plot, and non-woody herbaceous plants (including forbs, grasses, sedges, and rushes) within a 5-foot diameter plot. Plant species in each stratum were identified and absolute percent cover was recorded. Each species was listed following the scientific nomenclature given in the United States Department of Agriculture (USDA) PLANTS database (NRCS 2020b). The wetland indicator status for each species was assigned using the *2018 National Wetland Plant List for Great Plains Region* (USACE 2018).

The dominance test was the primary indicator used to determine the presence or absence of hydrophytic vegetation. A data point is considered to have a hydrophytic vegetation community if more than 50 percent of the dominant species have an indicator status of facultative (FAC), facultative-wetland (FACW), or obligate (OBL). Upland plant indicator statuses include upland (UPL) and facultative upland (FACU). Plants not listed (NL) are also typically found in uplands. Dominant species are defined as those that individually or collectively account for more than 50 percent of the total areal coverage of vegetation in the stratum, plus any other species that, by itself, accounts for at least 20 percent of the total areal coverage (USACE 2010). If more than 50 percent of the dominant plant species in a community have wetland indicator status of OBL, FACW, or FAC, then the plant community is considered hydrophytic (wetland).

Soils

Per USACE protocol, soil samples were obtained at representative data points by digging a pit to a depth of at least 18 inches if possible, to determine the presence or absence of hydric soil indicators using the *Field Indicators of Hydric Soils in the United States*, Version 8.2 (NRCS 2018). Soil colors were evaluated against a Munsell® soil color chart (GretagMacbeth 2000) to distinguish hydric from non-hydric soils.

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (USACE 2010). Hydric soils may exhibit certain characteristics that can be observed in the field; such as: high organic content, accumulation of sulfidic material, greenish or bluish-gray color (gley formation), depleted matrices, and development of redoximorphic features. Hydric soils in the study area were frequently saturated within 12 inches of the surface and exhibited dark and/or depleted matrices with redoximorphic features. Hydric soils typically had heavy clay content that retained surface water or maintained soil saturation for long durations.

Hydrology

Wetland hydrologic conditions are considered present if, during the growing season, an area is inundated or saturated to the surface continuously for at least 5 percent of the growing season in most years (50 percent probability of recurrence) (USACE 1987). Five percent of the growing season in the study area is seven days. The presence of primary and secondary wetland hydrologic indicators is used to determine the presence or absence of wetland hydrology at each wetland data point.

Primary indicators of wetland hydrology may include, but are not limited to, surface water, soil saturation within 12 inches of the surface, shallow water table, and evidence of previous water inundation or saturation (e.g., watermarks, algal mats, sediment deposits). Secondary indicators may include wetland drainage patterns, geomorphic position, stunted or stressed plants, and water-stained leaves. When at least one primary or two secondary indicators were observed, wetland hydrology was determined to occur during the growing season long enough to result in wetland conditions. Wetland hydrology indicators observed on site included high water table, surface water, soil saturation within 12 inches, salt crust, and sediment deposits.

2.3.2 Ordinary High Water Mark

The OHWM along Little Missouri River and tributaries was located in the field based on the methodology outlined in USACE Regulatory Guidance Letter 05-05 (USACE 2005). Identification of OHWM was based on the evaluation of stream physical characteristics, such as: presence of bed and banks, a natural line impressed on the bank, change in sediment and vegetation characteristics, wracking, erosion/scour, and silt deposits.

2.4 Wetland and Stream Classification and Functional Assessment

Wetlands were classified according to the Federal Geographic Data Committee (FGDC) Wetlands Classification Standard, commonly known as the Cowardin classification system, (Cowardin et al, 1979), and the hydrogeomorphic (HGM) classification system (Brinson 1993). The FGDC Wetlands Classification Standard primarily functions to classify wetlands by habitat types based on vegetation, and the HGM system assesses the chemical, physical, and biological functions of wetlands based on geomorphic setting and water source. HGM classes generally include lake-fringe, slope, depressional, riverine, and flats.

Wetland functions and values were evaluated subjectively based on best professional judgement using a descriptive approach (USACE 1999), including: groundwater recharge/discharge, flood flow alteration, fish and shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, wildlife habitat, recreation, educational/scientific value, uniqueness/heritage, visual quality/aesthetics, and endangered species habitat. Wetland and stream buffer conditions were qualitatively assessed based on vegetation cover, land use, and presence of invasive species.

2.5 Mapping Methods

Wetland and stream boundaries were located in the field by the Otak biologist and surveyed with a GeoXH 6000 Series handheld Global Positioning System (GPS) unit. The GPS data was differentially corrected in the office and then utilized in Geographical Information Systems (GIS) mapping programs to prepare maps for this report. Due to access and safety precautions, several data points were collected at the top of steep slopes and locations of wetland or stream boundaries were estimated laterally using offsets. Offsets were used at the top of bluff along the Little Missouri River and the steep ravine at the lower end of Tributary A in the North Unit. All other features in the North and South Units were accessible.

Chapter 3. Existing Conditions – North Unit

Eight wetlands and three watercourses were identified and delineated in the North Unit study area as shown on Figure 6 in Appendix B. Wetland determination data forms are provided in Appendix C. Wetlands and streams characteristics are summarized in Tables 3-1 to 3-10.

Table 3-1—Delineated Wetlands and Streams – North Unit

Resource ¹	Wetland Classification		Size/Length in Study Area		Comments
	FGDC ²	HGM	Acre	Linear Feet	
Wetland 1A	PEM1A	Slope	1.30	-	Linear slope wetland in confined drainage supported by groundwater seeps and separated by roads/culverts
Wetland 1B	PEM1A	Slope	0.70	-	
Wetland 1C	PEM1A	Slope	0.43	-	
Wetland 2	PEM1A	Slope	0.57	-	Broad slope wetland on hillside; drains to Tributary A/Wetland 1 system
Wetland 3	PEM1B	Depressional	0.01	-	Depressional wetland, groundwater seep on hillside
Wetland 4	PEM1A	Depressional	0.01	-	Depression at culvert outlet south of entrance drive
Wetland 5	PEM1A	Depressional	<0.01	-	Depression at culvert inlet north of entrance drive
Wetland 6	PAB3H	Depressional	0.17	-	Depression with groundwater seep, receives overbank flooding, recent beaver browse
Tributary A	R4SBC	-	-	~3,418	Originates offsite; flows in incised channel toward confluence with Wetland 1; then flows in deep ravine past maintenance shed
Tributary B	R4SBCx	-	-	~315	Ephemeral connection between Wetland 2 and Tributary A/Wetland 1; excavated
Little Missouri River	R2USA, R2UBF	-	-	~2,572	OHW located near toe of bluff; regular calving and slope failure from scour during high flows

Note:

1. Wetlands shown on Figure 6 in Appendix B.
2. FGDC/Cowardin classes: PEM1A = Palustrine emergent persistent temporarily flooded; PEM1B = Palustrine emergent persistent seasonally saturated; PAB3H = Palustrine aquatic bed rooted vascular permanently flooded; R4SBC = Riverine intermittent streambed seasonally flooded; R4SBCx = Riverine intermittent streambed seasonally flooded excavated; R2USA = Riverine perennial unconsolidated shore temporarily flooded; R2UBF = Riverine perennial unconsolidated bottom semi-permanently flooded.

3.1 Delineated Wetlands and Functions Evaluation


Eight wetlands were delineated in the North Unit study area identified on Figure 6 in Appendix B as Wetlands 1A, 1B, 1C, 2, 3, 4, 5, and 6. Wetland 1 is a broad linear slope wetland in a confined drainage that is conveyed through culverts underneath Scenic Drive and Maintenance Way. Wetland 1 was subdivided into Wetland 1A, 1B, and 1C for mapping purposes in this report based on the hydrological breaks caused by the road crossings. Wetland 1 confluences with Tributary A just west of Maintenance Way near the employee housing complex. Wetland 1C transitions to riverine habitat (Tributary A) where the drainage narrows and the gradient increases closer to where it discharges to the Little Missouri River.

Wetland 1 is supported by groundwater springs and surface runoff following precipitation events. Wetland 1 had shallow surface water flowing in rivulets through dense herbaceous vegetation during the site visit, and contained multiple step-pools in which small pockets of water transitioned into vegetated wetlands where the drainage had aggraded over time. Evidence of flash floods were also observed including wrack lines and vegetative debris along the drainage walls approximately five feet above the wetlands and culvert inlets. The substrate was dominated by clay fines that had eroded from adjacent upland areas. Hydric soil indicators included depleted matrices with redoximorphic concentrations in the upper soil profile.

Habitat in Wetland 1 is classified as palustrine emergent persistent temporarily flooded (PEM1A). Vegetation in Wetland 1 was dominated by three-square (*Shoenoplectus pungens*, OBL), slender-beak sedge (*Carex athrostachya*, FACW), salt-grass (*Distichlis spicata*, FACW), spike-rush (*Eleocharis palustris*, OBL), and prairie cordgrass (*Spartina pectinata*, FACW). Hardstem bulrush (*Shoenoplectus acutus*, OBL) populated springs and ponded areas with extremely soft mud substrates (e.g. quicksand). Distinct topographic breaks marked transitions to the upland riparian community that generally consisted of longleaf sage (*Artemisia longifolia*, FACU), wolfberry (*Symphoricarpos occidentalis*, UPL), smooth brome (*Bromus inermis*, UPL), crested wheatgrass (*Agropyron cristatum*, NL/UPL), and sweet clover (*Melilotus officinalis*, FACU).

Primary functions provided by the linear slope Wetlands 1A, 1B, and 1C include moderation of groundwater flow, velocity reduction of surface water flow, retention of particulates, organic carbon export in the dry landscape, maintenance of plant community, habitat diversity and connectivity between wetlands, and maintaining distribution and abundance of vertebrates and invertebrates. Chorus frogs (*Pseudacris nigrita*) were observed throughout Wetland 1. Wetland 1 provides educational and scenic value due their rarity in the landscape and because they can be seen from Scenic Drive. Wetland 1 characteristics and functions are summarized in Table 3-2.

Table 3-2—Wetland 1A-1B-1C Summary


WETLAND 1A-1B-1C – INFORMATION SUMMARY			
Location:		Centrally located in the study area flowing north to south	
	Size (in study area)	>2.43 acres	
	FGDC Classification	PEM1A	
	HGM Classification	Slope	
	Wetland Data Sheet	DP5-North	
	Upland Data Sheet	DP6-North	
	Regulated under the CWA?	Yes, abuts tributary to TNW.	
	Delineation Rationale	Satisfies all three wetland criteria.	
Dominant Vegetation		Shoenoplectus pungens, Carex athrostachya, Distichlis spicata, Eleocharis palustris, Spartina pectinata, Shoenoplectus acutus	
Soils		Silty clay; 10YR 4/2 and 3/2 with redox features and depletions	
Hydrology		Surface water, High water table, Saturation.	
Primary Wetland Functions-Values Summary			
Water Quality		Sediment retention/stabilization, nutrient production and export.	
Hydrologic		Floodflow alteration, groundwater discharge.	
Habitat		Provides habitat diversity and migration corridors for a variety of wildlife.	
Values		Educational/scientific research and uniqueness/heritage due to rarity in the landscape, and visual quality/aesthetics because these wetlands are visible from Scenic Drive.	

Wetland 2 is a linear slope wetland with undulating depressions from livestock use and previous disturbances. Wetland hydrology is supported by a groundwater seeps at its northern end along its eastern edge where salt flats have developed interspersed with salt-tolerant vegetation patches. Wetland 2 also receives surface runoff from the surrounding concave landscape. Disturbances in the wetland and buffer include overhead utility lines, fencing, and livestock use.

Wetland 2 habitat is classified as palustrine emergent persistent temporarily flooded (PEM1A). Dominant wetland vegetation included alkaligrass (*Puccinellia nuttalliana*, OBL), narrow-leaved cattail (*Typha angustifolia*, OBL), Canada thistle (*Cirsium arvense*, FAC), and three-square. Surface water flows from north to south, and an excavated channel connects Wetland 2 to a natural erosional channel (Tributary B) that discharges to Wetland 1C and Tributary A. Distinct topographic breaks marked transitions to the grassland buffer community that generally consisted of smooth brome, crested wheatgrass, prairie coneflower (*Ratibada columnifera*, UPL/NL), and sweet clover.

Primary functions provided by Wetland 2 include moderation of groundwater flow, velocity reduction of surface water flow, retention of particulates, organic carbon export in the dry landscape, maintenance of plant community, habitat diversity and connectivity between wetlands, and maintaining distribution and abundance of vertebrates and invertebrates. Wetland 2 also functions to remove excess nutrients from livestock waste. Wetland 2 characteristics and functions are summarized in Table 3-3.

Table 3-3—Wetland 2 Summary


WETLAND 2 – INFORMATION SUMMARY			
Location:		Along the eastern property boundary south of Scenic Drive and entrance kiosk	
	Size (in study area)	0.57 acre	
	FGDC Classification	PEM1A	
	HGM Classification	Slope	
	Wetland Data Sheet	DP1-North	
	Upland Data Sheet	DP2-North	
	Regulated under the CWA?	Yes, abuts tributary to TNW.	
	Delineation Rationale	Satisfies all three wetland criteria.	
Dominant Vegetation	<i>Puccinellia nutalliana</i> , <i>Typha angustifolia</i> , <i>Cirsium arvense</i> , <i>Shoenoplectus pungens</i>		
Soils	Silty clay, 10YR 3/2 and 3/1 with redox features and depletions in the upper profile		
Hydrology	High water table, Saturation, Surface water, Salt crust		
Primary Wetland Functions-Values Summary			
Water Quality	Sediment retention/stabilization, nutrient production and export.		
Hydrologic	Floodflow alteration, groundwater discharge.		
Habitat	Provides habitat diversity and migration corridor for a variety of wildlife; food source for birds due to abundant insect population.		
Values	Uniqueness/heritage due to rarity in the landscape.		

Wetland 3 is a small depressional wetland supported by a shallow water groundwater seep. Livestock trampling has caused the side slopes of the linear feature to collapse, which causes water to temporarily pond and develop saturated soil conditions. It appears isolated from other surface waters and wetland habitats, but during snowmelt and large precipitation events it likely overflows into a wooded draw that connects to Wetland 1C approximately 300 feet downslope to the southwest.

Habitat in Wetland 3 is classified as palustrine emergent persistent seasonally saturated (PEM1B). Dominant vegetation includes spike rush (*Elocharis palustris*, OBL), cocklebur (*Xanthium strumarium*, FAC), and Canada thistle. Distinct topographic breaks mark the transition to the upland plant community consisting of longleaf sage, smooth brome, crested wheatgrass, and bluegrass (*Poa pratensis*, FACU).

Primary functions provided by Wetland 2 include maintaining water quality (e.g., sediment and nutrient retention from livestock use) and providing hydrologic functions (e.g., groundwater recharge and discharge). Wetland 3 has low habitat functions and value due to the ongoing disturbance regime and isolation on the landscape. Wetland 3 characteristics and functions are summarized in Table 3-4.

Table 3-4—Wetland 3 Summary

WETLAND 3 – INFORMATION SUMMARY			
Location:		East of Maintenance Way and south of Scenic Drive on hillside slope	
	Size (in study area)	0.01 acre	
	FGDC Classification	PEM1B	
	HGM Classification	Depressional	
	Wetland Data Sheet	DP3-North	
	Upland Data Sheet	DP4-North	
	Regulated under the CWA?	Yes, surface connection during storm events to Wetland 1C/Tributary A.	
	Delineation Rationale	Satisfies all three wetland criteria.	
Dominant Vegetation		<i>Elocharis palustris</i> , <i>Xanthium strumarium</i> , <i>Cirsium arvense</i>	
Soils		Clay, 10YR 3/2 with redox features and depletions in the upper soil profile	
Hydrology		High water table, Saturation, Surface water.	
Primary Wetland Functions-Values Summary			
Water Quality		Sediment and nutrient retention.	
Hydrologic		Groundwater recharge and discharge.	
Habitat		Low habitat functions due to livestock use.	
Values		Low value due to disturbance regime and isolation on the landscape.	

Wetlands 4 and 5 are small (<0.01 acre) depressional wetlands located at the toe of the entrance road east of the kiosk, and are connected by a metal culvert through the road embankment. Wetland 5 is on the north side of the entrance road at the culvert inlet, and Wetland 4 is on the downslope side at the culvert outfall. Both wetlands are depressional pockets with clay pans and surface soil cracks that likely formed after the culvert was installed and the culvert concentrated stormwater flows from the surrounding uplands. Wetland vegetation was dominated by cocklebur, slender-beak sedge, and foxtail barley (*Hordeum jubatum*, FACW). Upland vegetation around the wetlands was dominated by longleaf sage, smooth brome, and crested wheatgrass. Habitat in Wetland 4 and 5 is classified as palustrine emergent persistent temporarily flooded (PEM1A). Primary functions provided by Wetlands 4 and 5 include water quality maintenance (e.g., sediment retention) and hydrologic (e.g., groundwater recharge). These wetlands have low value due to their proximity to the entrance road, low educational/scientific value, and low habitat functions. See Table 3-5 and Table 3-6 for summaries of Wetlands 4 and 5.

Table 3-5—Wetland 4 Summary



WETLAND 4 – INFORMATION SUMMARY		
Location:	South of Scenic Drive, east of entrance kiosk, at toe of road embankment	
	Size (in study area)	0.01 acre
	FGDC Classification	PEM1A
	HGM Classification	Depressional
	Wetland Data Sheet	DP3-North
	Upland Data Sheet	DP4-North
	Regulated under the CWA?	No, no surface connection to other regulated waters.
	Delineation Rationale	Satisfies all three wetland criteria.
Dominant Vegetation	<i>Xanthium strumarium</i> , <i>Carex athrostachya</i> , <i>Hordeum jubatum</i>	
Soils	Clay, 10YR 3/2 with redox features and depletions in the upper soil profile	
Hydrology	Saturation, Surface soil cracks	
Primary Wetland Functions-Values Summary		
Water Quality	Sediment and nutrient retention	
Hydrologic	Groundwater recharge	
Habitat	Low habitat functions due to proximity to road and flashy hydroperiod.	
Values	Low value due to proximity to road and low educational/scientific value.	


Table 3-6—Wetland 5 Summary

WETLAND 5 – INFORMATION SUMMARY			
Location:		North of Scenic Drive, east of entrance kiosk, at toe of road embankment	
	Size (in study area)	<0.01 acre	
	FGDC Classification	PEM1A	
	HGM Classification	Depressional	
	Wetland Data Sheet	DP3-North	
	Upland Data Sheet	DP4-North	
	Regulated under the CWA?	No, no surface connection to other regulated waters.	
	Delineation Rationale	Satisfies all three wetland criteria.	
Dominant Vegetation		<i>Xanthium strumarium</i> , <i>Hordeum jubatum</i> , <i>Bromus inermis</i>	
Soils		Clay, 10YR 3/2 with redox features and depletions in the upper soil profile	
Hydrology		Saturation, Surface soil cracks	
Primary Wetland Functions-Values Summary			
Water Quality		Sediment and nutrient retention	
Hydrologic		Groundwater recharge	
Habitat		Low habitat functions due to proximity to road and flashy hydroperiod.	
Values		Low value due to proximity to road and low educational/scientific value.	

Wetland 6 is a ponded depressional wetland in the floodplain of the Little Missouri River and supported by a groundwater seep along its northwestern edge. Concentric rings of vegetation reflect different hydrologic regimes in the wetland. Small pondweed (*Potamogeton pusillus*, OBL) grows in the perennially ponded areas with spike-rush, narrow-leaved cattail, and sandbar willow (*Salix interior*, FACW) growing along the outer edges. A small ridge separates Wetland 6 from the OHWM of the Little Missouri River. Depth of ponding appeared to be three to four feet based on the elevation of the outlet and wrack lines. A beaver slide was observed along with evidence of recent beaver browse on the willow stems. A fence crosses through the northwest corner of the wetland but does not appear to restrict beaver movement. Habitat in Wetland 6 is classified as palustrine aquatic bed rooted vascular permanently flooded (PAB3H). Distinct topographic breaks marked transitions to the woodland buffer community consisting of American elm (*Ulmus Americana*, FAC), common juniper (*Juniperus communis*, UPL), wolfberry, wood's rose (*Rosa woodsii*, FACU), leafy spurge (*Euphorbia esula*, NL/UPL), and bluegrass.

Wetland 6 provides a high level of water quality, hydrologic, and habitat functions and values due to its proximity to the Little Missouri River and use by beavers. The ponding provides a unique habitat in the semi-arid landscape. Wetland 6 retains sediment and provides flood storage during high flows in the Little Missouri River, and supports groundwater recharge and benthic macroinvertebrates. Wetland 6 characteristics and functions are summarized in Table 3-7.


Table 3-7—Wetland 6 Summary

WETLAND 6 – INFORMATION SUMMARY			
Location:		Left bank of Little Missouri River along western study area boundary	
	Size (in study area)	0.17 acre	
	FGDC Classification	PAB3H	
	HGM Classification	Depressional	
	Wetland Data Sheet	DP7-North	
	Upland Data Sheet	DP8-North	
	Regulated under the CWA?	Yes, adjacent to TNW.	
	Delineation Rationale	Satisfies all three wetland criteria.	
Dominant Vegetation		<i>Elocharis palustris</i> , <i>Potamogeton pusillus</i> , <i>Typha angustifolia</i> , <i>Salix interior</i>	
Soils		Clay, 10YR 3/2 with redox features and depletions in the upper soil profile	
Hydrology		High water table, Saturation, Surface water.	
Primary Wetland Functions-Values Summary			
Water Quality		Sediment and nutrient retention, production export, sediment stabilization.	
Hydrologic		Groundwater recharge and discharge, floodflow alteration.	
Habitat		High habitat functions due to beaver presence.	
Values		High value due to uniqueness on the landscape and use by wildlife.	

3.2 Delineated Watercourses and Riparian Buffers

Three watercourses were delineated in the study area, identified in this report and on Figure 6 in Appendix B as Tributary A, Tributary B, and the Little Missouri River. Tributary A flows from north to south through the center of the study area, and confluences with Wetland 1 west of Maintenance Way and north of the employee housing area. It flows through culverts underneath Scenic Drive and Maintenance Way, and backwatering during flood events at the culvert inlets was evidenced by wrack lines approximately five feet above the culvert inlet elevations. Upstream of Maintenance Way, habitat in Tributary A is classified as riverine intermittent streambed seasonally flooded (R4SBC) and flows in a three to five-foot wide low flow channel within a steep-sided ravine. Downstream of Maintenance Way the channel broadens and water velocities decrease, which allows the tributary to aggrade and support the development of wetland vegetation and a step-pool system with intermittent vegetated and ponded areas (Wetland 1C). Wetland 1C transitions back to a fluvial environment and R4SBC habitat as Tributary A flows in a deep ravine with higher velocities towards its confluence with the Little Missouri River. Riparian habitat includes shrub and grasslands in good to moderate condition. Riparian functions are limited by the gravel roads to the well house and maintenance facilities, and Maintenance Way and Scenic Way which are paved. Common woody riparian vegetation included American elm, cottonwood (*Populus deltoides*, FAC), common juniper, wolfberry, and wood's rose, and grasslands commonly included smooth brome, wheatgrass species, bluegrass, and various forbs. Characteristics of Tributary A are summarized in table 3-8.

Table 3-8—Tributary A Summary

TRIBUTARY A - INFORMATION SUMMARY		
Location:	North-south alignment through the center of the study area	
	Stream Name	Unnamed (Tributary A)
	FGDC Classification	R4SBC
	USACE Classification	Tributary to TNW (Little Missouri River)
	Flow regime	Intermittent
	Fish Use	No
	Average Width	3-5'
	Comments	Tributary A flows in a deeply incised ravine. OHW estimated with offsets from top of bluff downstream of Wetland 1C (inaccessible).
Riparian Buffer Condition	Riparian buffer consists of shrub and grassland habitat in moderately good condition with limited evidence of browse and trampling by livestock. Buffer is impacted near road crossings and along the dirt access road near the maintenance facilities and storage yard in the southern portion of the study area.	

Tributary B conveys surface water in an approximate 2-foot wide channel from Wetland 2 to Wetland 1C/Tributary A. The upper portion of Tributary B was excavated as evidenced by the raised berms that parallel it, and transitions to a steep, wooded drainage for approximately 250 feet before confluencing with Wetland 1C/Tributary A. Tributary B is incised with overhanging vegetation on both sides. Habitat in Tributary B is classified as riverine intermittent streambed seasonally flooded excavated (R4SBCx). Riparian habitat is in good condition, and wildlife movement is limited by a fence that parallels the north side of Tributary B. Tributary B characteristics are summarized in Table 3-9.

The Little Missouri River parallels the south side of the study area. It is classified by the USACE as a Traditional Navigable Water (TNW), and habitat classes in the study area include riverine perennial unconsolidated shore temporarily flooded (R2USA) and riverine perennial unconsolidated bottom semipermanently flooded (R2UBF). Steep bluffs greater than 50 feet tall along the left bank near the sewage lagoons and employee housing transition to shorter bluffs and a broader floodplain further upstream to the northwest. Calving from erosion during high flows causes the bluff to occasionally collapse into large clay peds along the shoreline, and provides habitat for willows and other flood tolerant species to establish over time. Sinkholes and slumping were observed at the top of bluff from precipitation infiltrating through seams. Riparian buffer habitat along the bluff area is largely disconnected from the Little Missouri River due to the elevational differences, and vegetation communities are impacted by the sewage lagoons, materials storage, and routine mowing at the top of bluff. Riparian vegetation is in good condition north of the employee housing area and was not disturbed. Little Missouri River characteristics within the study area are summarized in Table 3-10

Table 3-9—Tributary B Summary



TRIBUTARY B - INFORMATION SUMMARY			
Location:		In the southern portion of the study area east of the maintenance buildings	
		Stream Name	Unnamed (Tributary B)
		FGDC Classification	R4SBCx
		USACE Classification	Tributary to TNW (Little Missouri River)
		Flow regime	Intermittent
		Fish Use	No
		Average Width	2'
		Comments	Tributary B conveys surface water from Wetland 2 to Wetland 1C/Tributary A during heavy precipitation events. Partially excavated with overhanging vegetation.
Riparian Buffer Condition	Riparian buffer consists of shrub and grassland habitat in good condition with limited evidence of browse and trampling by livestock. Wildlife movement is limited by a fence north of Tributary B.		

Table 3-10—Little Missouri River Summary

LITTLE MISSOURI RIVER - INFORMATION SUMMARY			
Location:		Along southwestern and southern study area boundary	
		Stream Name	Little Missouri River
		Cowardin Classification	R2USA, R2UBF
		USACE Classification	TNW
		Flow regime	Perennial
		Fish Use	Yes
		Average Width	200-400'
		Comments	OHW estimated using offsets from top of bluff south of the employee housing area.
Riparian Buffer Condition		Riparian buffer consists of forested, shrub, and grassland habitat in good condition. Buffer is partially impacted by sewage lagoons, material storage, and regular mowing at the top of the bluff. Slumping, sinkholes, and calving observed along the edge of the bluff.	

3.3 Sensitive Plants, Fish, and Wildlife

North Dakota has twelve species listed as threatened or endangered under the federal ESA of 1973. North Dakota does not have a separate state endangered or threatened species list. Only those species listed under the ESA are considered threatened or endangered in North Dakota (NDGFD 2020a). The USFWS administers and implements protections under the ESA in North Dakota. The USFWS Information, Planning and Consultation (IPAC) system lists seven species potentially occurring in the study area of the North Unit: northern long-eared bat (*Myotis septentrionalis*, Threatened), least tern (*Sterna antillarum*, Endangered), piping plover (*Charadrius melodus*, Threatened), red knot (*Calidris canutus rufa*, Threatened), whooping crane (*Grus Americana*, Endangered), pallid sturgeon (*Scaphirhynchus albus*, Endangered), and Dakota skipper (*Hesperia dacotae*, Threatened) (USFWS 2020a). The potential presence of these species in the study area will be evaluated in coordination with the USFWS during development of the Environmental Assessment for compliance with NEPA and ESA. Designated critical habitat for these species does not occur within the study area.

3.4 CWA Jurisdictional Assessment

Wetlands and watercourses in the study area are potentially regulated by the USACE under the CWA. The definition of WOTUS was recently updated on June 22, 2020 under the Navigable Waters Protection Rule. The Little Missouri River is classified as a Traditional Navigable Water and is a jurisdictional water. Both Tributary A and Tributary B have surface water connections to the Little Missouri River and are assumed to be jurisdictional. Wetlands 1, 2, 3, and 6 are classified as associated wetlands and are assumed to be jurisdictional. Wetlands 4 and 5 do not have a surface water connection either tributary or the associated wetlands, and therefore is assumed to be non-jurisdictional under the CWA.

Chapter 4. Existing Conditions – South Unit

Three wetlands and five watercourses were identified and delineated in the South Unit study area as shown on Figure 7 in Appendix B. Wetland determination data forms are provided in Appendix C. Wetlands and streams characteristics are summarized in Tables 4-1 to 4-9.

Table 4-1—Delineated Wetlands and Streams – South Unit

Resource ¹	Classification		Size/Length in Study Area		Comments
	Cowardin ²	HGM	Acre	Linear Feet	
Wetland 1	PFO1A	Depressional	0.11	-	Supported by stormwater discharges from visitor center parking lot
Wetland 2	PUBJx	Depressional	0.04	-	Artificial; excavated pond for sediment management
Wetland 3	PEM1A	Slope	0.01	-	Artificial; drainage ditch with stormwater outfalls
Tributary A	R4SBA	-	-	~1,035	Ephemeral; concentrated flows from hillside following storm events; dissipates in alluvial fan
Tributary B	R4SBCr, R4SBCx	-	-	~1,959	Concrete-lined channel in town, transitions to excavated channel after Main St.
Tributary C	R4SBA	-	-	~75	Ephemeral, groundwater seeps, dissipates in alluvial fan
Tributary D	R4SBA	-	-	~80	Ephemeral, groundwater seeps, dissipates in alluvial fan
Little Missouri River	R2USA, R2UBF	-	-	~1,350	OHW located west of broad floodplain bench and floodplain forest

Note:

1. Wetlands and streams shown on Figure 7 in Appendix B.
2. FGDC/Cowardin classes: PFO1A = Palustrine forested broad-leaved deciduous temporarily flooded; PUBJx = Palustrine unconsolidated bottom intermittently flooded excavated; PEM1A = Palustrine emergent persistent temporarily flooded; R4SBC = Riverine intermittent streambed seasonally flooded; R4SBCr = Riverine intermittent streambed seasonally flooded artificial substrate; R4SBCx = Riverine intermittent streambed seasonally flooded excavated; R4SBA = Riverine intermittent streambed temporarily flooded; R2USA = Riverine perennial unconsolidated shore temporarily flooded; R2UBF = Riverine perennial unconsolidated bottom semi-permanently flooded.

4.1 Delineated Wetlands and Functions Evaluation


Three wetlands were delineated in the South Unit study area identified on Figure 7 in Appendix B as Wetlands 1, 2, and 3. Wetland 1 is a depressional wetland located at the outlet of a stormwater pipe along the north side of the Visitor Center parking lot. Wetland 1 does not have a surface connection to any other wetlands or watercourses, and is located in the mapped 100-year floodplain of the Little Missouri River. Groundwater was observed at five inches below ground surface, and surface water was observed in the linear depression extending from the outfall that overflowed into a depressional pocket. Hydric soil indicators included depleted matrices below dark surfaces.

Habitat in Wetland 1 is classified as palustrine forested broad-leaved deciduous temporarily flooded (PFO1A). Dominant vegetation included eastern cottonwood and green ash (*Fraxinus pennsylvanica*, FAC) trees and saplings, red-twig dogwood (*Cornus sericea*, FACW), fowl bluegrass (*Poa palustris*, FACW), and an unidentified sedge (*Carex* sp., FACW or wetter). The sedge species was not identifiable in the field because a seed head was not found. It was assumed to be rated FACW or wetter due its establishment in saturated soil conditions and ponded areas. Upland vegetation also included eastern cottonwood and green ash trees and saplings, but also

included species typical of uplands including wolfberry and smooth brome. Soil profiles also transitioned to bright matrices (2.5Y 4/3 and 5/3) and were dry.

Primary functions provided by Wetland 1 include water quality maintenance (e.g., sediment/toxicant retention, nutrient removal), hydrologic (e.g., groundwater recharge, flood storage), and wildlife habitat. Wetland 1 receives stormwater from the Visitor Center parking lot and East River Road, and retains sediment and pollutants without discharging to other surface waters. Wetland 1 provides wildlife habitat diversity in the semi-arid landscape, but its functions are limited due to its proximity to the Visitor Center and parking lot. Wetland 1 has moderate value due to the stormwater treatment it provides, and the visual quality and aesthetics provided by its adjacency to the Visitor Center and Theodore Roosevelt's cabin. Wetland 1 characteristics are summarized in Table 4-2.


Table 4-2—Wetland 1 Summary

WETLAND 1 – INFORMATION SUMMARY			
Location:		North of Visitor Center and parking lot and east of Theodore Roosevelt's cabin	
		Size (in study area)	>0.11 acre
		FGDC Classification	PFO1A
		HGM Classification	Depressional
		Wetland Data Sheet	DP1-South
		Upland Data Sheet	DP2-South
		Regulated under the CWA?	No, in mapped floodplain of Little Missouri River but not inundated in a typical water year.
		Delineation Rationale	Satisfies all three wetland criteria.
Dominant Vegetation		Fraxinus pennsylvanica, Populus deltoides, Cornus sericea, Poa palustris, Carex sp.	
Soils		Clay; 10YR 3/2 and 4/2 with redox features and depletions	
Hydrology		Surface water, High water table, Saturation.	
Primary Wetland Functions-Values Summary			
Water Quality		Sediment and toxicant retention, nutrient removal.	
Hydrologic		Flood storage, groundwater recharge.	
Habitat		Provides habitat diversity and but limited by adjacent development.	
Values		Stormwater treatment and visual quality/aesthetics because Wetland 1 is visible from the Visitor Center and surrounding area.	

Wetland 2 is a ponded, depressional wetland excavated in uplands to capture and retain sediment from eroding hillsides and nearby draws. A low berm and excavated swale have been constructed to direct surface flows from heavy precipitation events into the pond. Wetland 2 functions as a sediment basin to capture the clay fines so they do not enter the concrete lined channel (Tributary B in this report) that flows through the City of Medina. Highly erodible soils were observed in the draw and drainage pathway but no OHW was observed that would make it a jurisdictional feature. The end of the swale is lined with concrete and buried under approximately two inches of sediment. Vegetation in the swale was dominated by upland plants such as smooth brome. Wetland 2 is surrounded by a stand of eastern cottonwood trees and is enclosed by fencing. Vegetation was not observed growing in the pond. Primary functions provided by Wetland 2 include sediment retention and flood storage


because it retains stormwater runoff from the hillsides upslope. It is moderately valuable as a sediment basin for maintaining city infrastructure. Wetland 2 characteristics and functions are summarized in Table 4-3.

Table 4-3—Wetland 2 Summary

WETLAND 2 – INFORMATION SUMMARY			
Location:		East of town near the east end of Second Avenue	
		Size (in study area)	0.04 acre
		FGDC Classification	PUBJx
		HGM Classification	Depressional
		Wetland Data Sheet	-
		Upland Data Sheet	-
		Regulated under the CWA?	No, excavated wholly in uplands for the purpose of stormwater management.
		Delineation Rationale	Meets FGDC mapping standard.
Dominant Vegetation		Populus deltoides, Bromus inermis	
Soils		Mud	
Hydrology		Surface water	
Primary Wetland Functions-Values Summary			
Water Quality		Sediment retention.	
Hydrologic		Floodflow alteration.	
Habitat		Low habitat value due to periodic maintenance, fencing, and sediment-laden water.	
Values		Moderate societal value to minimize maintenance of concrete conveyance through town.	

Wetland 3 is a roadside ditch artificially constructed in uplands adjacent to the east side of East River Road and north of 3rd Avenue. A stormwater pipe north of 3rd Avenue discharges stormwater collected from Pacific Avenue and the surrounding developed area. Stormwater flows north through Wetland 3 and discharges to Tributary B, which flows through two culverts underneath East River Road. Vegetation in Wetland 3 is dominated by green ash saplings and bluegrass that appeared to be mowed periodically. Soil profiles were characterized by dark surfaces with redoximorphic concentrations and depletions in the top twelve inches. Soils were saturated during the time of the site investigation. The primary function of Wetland 3 is for stormwater treatment to retain sediment and toxicants and remove nutrients. Habitat in Wetland 3 is classified as palustrine emergent persistent temporarily flooded. Wetland 3 is classified as slope in the HGM system, and its characteristics and functions are summarized in Table 4-4.


Table 4-4—Wetland 3 Summary

WETLAND 3 – INFORMATION SUMMARY				
Location:		At the northeast corner of the East River Road and 3 rd Avenue intersection		
		Size (in study area)	0.01 acre	
		FGDC Classification	PEM1A	
		HGM Classification	Slope	
		Wetland Data Sheet	-	
		Upland Data Sheet	-	
		Regulated under the CWA?	No, ditches constructed in uplands are not WOTUS.	
		Delineation Rationale	Presence of hydric soils and wetland hydrology with disturbed vegetation community.	
Dominant Vegetation		Fraxinus pennsylvanica, Poa pratensis		
Soils		Loam; 10YR 2/1 with redox features (10YR 5/6) and depletions (10YR 4/1)		
Hydrology		High water table, Saturation.		
Primary Wetland Functions-Values Summary				
Water Quality		Sediment and toxicant retention, and nutrient removal.		
Hydrologic		Floodflow alteration, groundwater recharge.		
Habitat		Low wildlife functions due to adjacent roads and regular vegetation maintenance.		
Values		Moderate societal value to treat stormwater runoff and improve water quality.		

4.2 Delineated Watercourses and Riparian Buffers

Five watercourses were delineated in the study area, identified in this report and on Figure 7 in Appendix B as Tributary A, Tributary B, Tributary C, Tributary D, and the Little Missouri River. Tributary A emanates from the hillsides east of the NPS maintenance facilities area and flows through a culvert underneath East River Road. Surface flows disperse onto an alluvial fan west of East River Road approximately 1,400 linear feet from the bank of the Little Missouri River. A berm and grass swale constructed parallel to the maintenance yard at the base of the hillside concentrates surface water runoff during precipitation events and conveys it north. Dominant vegetation the swale included plants typical of uplands such as smooth brome, leafy spurge, Canada thistle, cheatgrass (*Bromus tectorum*, NL/UPL), and big sagebrush (*Artemisia tridentata*, NL/UPL). A defined channel with an OHWM develops towards the northern end of the swale and confluences with an ephemeral stream flowing west out of a draw as shown on Figure 7 in Appendix B. Tributary A is incised and approximately two to three feet wide. Habitat in Tributary A is classified as riverine intermittent streambed temporarily flooded (R4SBA). Riparian habitat is in good to moderate condition but also limited by the entrance road to the maintenance facility. Common riparian vegetation included eastern cottonwood, serviceberry (*Amelanchier alnifolia*, FACU), sagebrush, and smooth brome. Tributary A characteristics are summarized in Table 4-5.

Table 4-5—Tributary A Summary

TRIBUTARY A - INFORMATION SUMMARY			
Location:		North-south alignment through the center of the study area	
		Stream Name	Unnamed (Tributary A)
		FGDC Classification	R4SBA
		USACE Classification	Not regulated, no surface connection to a WOTUS.
		Flow regime	Ephemeral
		Fish Use	No
		Average Width	2-3'
		Comments	Tributary A flows in an incised channel in response to precipitation events; substrate is dominated by eroded clay fines.
Riparian Buffer Condition	Riparian buffer consists of shrub and grassland habitat in moderately good condition. Buffer is impacted near the East River Road crossing and entrance drive to the maintenance facilities.		

Tributary B begins along the east side of Fourth Street between 2nd Avenue and 3rd Avenue, and flows in an approximately 4 foot-wide concrete channel west toward the Little Missouri River. The concrete channel ends west of Main Street and transitions to a five-foot wide excavated channel with a natural substrate. Tributary B then flows through a double culvert underneath East River Road and west of the Visitor Center to the north and northwest. Floodgates have been installed on the double culverts to prevent floodwaters from the Little Missouri River entering the City of Medora during high flow events. Tributary B flows through a narrow, forested riparian corridor around Chimney Park and then infiltrates in sandy soils on a floodplain terrace approximately 100 feet east of the Little Missouri River. Forested riparian vegetation included green ash, eastern cottonwood, woods rose, wolfberry, red-twig dogwood, and willows along the forest edges. Habitat in Tributary B is classified as riverine intermittent streambed seasonally flooded artificial substrate (R4SBCr) and excavated (R4SBCx). Tributary B characteristics are summarized in Table 4-6.

Tributary C and Tributary D are ephemeral drainages in eroded bluffs that receive surface water runoff and groundwater seeps emanating from coal seams in incised ravines. Surface water in both tributaries disperses onto alluvial fans consisting of clay fines, and infiltrates east of the Little Missouri River. Both channels are approximately one-foot wide. The groundwater seeps cause the ravine sides to slump and erode over time. Riparian vegetation along the channels included big sagebrush, rabbitbrush (*Chrysothamnus nauseosus*, NL/UPL), saltgrass, and smooth brome. Habitat in Tributaries C and D is classified as riverine intermittent streambed temporarily flooded (R4SBA). Surface water was flowing at the time of the site visit. Tributary C and D characteristics are summarized in Table 4-7 and Table 4-8.

Table 4-6—Tributary B Summary


TRIBUTARY B - INFORMATION SUMMARY			
Location:	Center of town and west of East River Road		
	Stream Name	Unnamed (Tributary B)	
	FGDC Classification	R4SBCr, R4SBCx	
	USACE Classification	Tributary to TNW (Little Missouri River)	
	Flow regime	Intermittent	
	Fish Use	No	
	Average Width	3-6'	
	Comments	Tributary B flows in a concrete channel through town and then in a straightened channel around Chimney Park.	
Riparian Buffer Condition	Riparian buffer is minimal through town then transitions to a narrow forest corridor with adjacent maintained lawn areas around Chimney Park.		

Table 4-7—Tributary C Summary




TRIBUTARY C - INFORMATION SUMMARY			
Location:		Northwest portion of study area between East River Road and the Little Missouri River	
	Stream Name	Unnamed (Tributary C)	
	FGDC Classification	R4SBA	
	USACE Classification	No, has an ephemeral flow regime with no surface water connection to other WOTUS.	
	Flow regime	Ephemeral	
	Fish Use	No	
	Average Width	1-2'	
	Comments	Tributary C flows in an incised ravine then dissipates on an alluvial fan of clay fines.	
Riparian Buffer Condition	Riparian buffer is limited by steep slopes within the ravine. Riparian shrub and herbaceous vegetation primarily functions to stabilize eroding soils.		

Table 4-8—Tributary D Summary

TRIBUTARY D - INFORMATION SUMMARY			
Location:		Northwest portion of study area between East River Road and the Little Missouri River	
		Stream Name	Unnamed (Tributary D)
		FGDC Classification	R4SBA
		USACE Classification	No, has an ephemeral flow regime with no surface water connection to other WOTUS.
		Flow regime	Ephemeral
		Fish Use	No
		Average Width	1-2'
		Comments	Tributary D flows in an incised ravine then dissipates on an alluvial fan of clay fines.
Riparian Buffer Condition	Riparian buffer is limited by steep slopes within the ravine. Riparian shrub and herbaceous vegetation primarily functions to stabilize eroding soils.		

The Little Missouri River parallels the northwestern edge of the study area for approximately 1,350 feet. It is classified by the USACE as a TNW, and habitat classes in the study area include riverine perennial unconsolidated shore temporarily flooded (R2USA) and riverine perennial unconsolidated bottom semipermanently flooded (R2UBF). The OHWM was based on evidence of scour, bed and banks, gravel sorting, and the presence of floodplain terraces along the right bank that supported plants tolerant of saturated soil conditions versus upland plants. Herbaceous plants below the OHWM included prairie cordgrass, three-square, and spike-rush, and plants above the OHWM included wild licorice (*Glycyrrhiza lepidota*, FACU), sweet clover, showy milkweed (*Asclepias speciosa*, FAC), leafy spurge, and smooth brome. Soil profiles on the floodplain terraces above the OHWM had bright matrices (10YR 3/3 and 4/3) and sandy texture. Riparian vegetation also included a row of eastern cottonwood trees that paralleled the river approximately 100 to 150 feet to the east. Evidence of recent beaver browse was also observed. Little Missouri River characteristics within the study area are summarized in Table 4-9.

Table 4-9—Little Missouri River Summary

LITTLE MISSOURI RIVER - INFORMATION SUMMARY			
Location:		Northwestern edge of the study area	
	Stream Name		Little Missouri River
	FGDC Classification		R2USA, R2UBF
	USACE Classification		TNW
	Flow regime		Perennial
	Fish Use		Yes
	Average Width		100-150'
	Comments		Broad floodplain on right bank of river.
Riparian Buffer Condition		Riparian buffer consists of forested, shrub, and grassland habitat in good condition on the right bank within the study area and is engaged during flood events.	

4.3 Sensitive Plants, Fish, and Wildlife

North Dakota has twelve species listed as threatened or endangered under the federal ESA of 1973. North Dakota does not have a separate state endangered or threatened species list. Only those species listed under the ESA are considered threatened or endangered in North Dakota (NDGFD 2020). The USFWS administers and implements protections under the ESA in North Dakota. The USFWS IPAC system lists seven species potentially occurring in the study area of the North Unit: northern long-eared bat (Threatened) and whooping crane (Endangered) (USFWS 2020a). The potential presence of these species in the study area will be evaluated in coordination with the USFWS during development of the Environmental Assessment for compliance with NEPA and ESA. Designated critical habitat for these species does not occur within the study area.

4.4 Regulatory Summary

Wetlands and watercourses in the study area are potentially regulated by the USACE under the CWA. The definition of WOTUS was recently updated on June 22, 2020 under the Navigable Waters Protection Rule. The Little Missouri River is classified as a Traditional Navigable Water and is a jurisdictional water. Tributaries A, C, and D have ephemeral flow regimes with no surface water or clear ground water connection to other WOTUS, and therefore are assumed to be not regulated under the CWA. Tributary B has an intermittent flow regime with a clear groundwater connection to the Little Missouri River, and is assumed to be jurisdictional. Wetland 1 does not have a surface water connection to a regulated tributary or other WOTUS, and therefore is assumed to be non-jurisdictional. Wetland 2 and Wetland 3 are artificial stormwater features constructed in uplands, and therefore are assumed to be non-jurisdictional under the CWA.

Chapter 5. References

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Appendix A

Methods and Tools

Table A-1—Methods and Tools Used to Prepare the Report

Parameter	Method or Tool	Website	Reference
Wetland Delineation	Corps of Engineers Wetlands Delineation Manual	http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf	U.S. Army Corps of Engineers. 1987. <i>Corps of Engineers Wetland Delineation Manual</i> . Environmental Laboratory Wetlands Research Program Technical Report Y-87-1, U.S. Army Corps of Engineers, Engineer Waterways Experiment Station, Vicksburg, Mississippi.
	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: GPR	https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/	U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0), ed. J.S. Wakely, R. W. Lichvar, and C.V. Noble. ERDC/EL TR-10-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
Wetland Classification	FGDC	https://www.fgdc.gov/standards/projects/wetlands/nwcs-2013	Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.
	Hydrogeomorphic Classification (HGM) System	http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf	Brinson, M. M. 1993. "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A270 053.
Wetland Functions Assessment	The Highway Methodology Workbook Supplement – Wetland Functions and Values, A Descriptive Approach	https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/HighwaySupplement6Apr2015.pdf	U.S. Army Corps of Engineers. 1999. The Highway Methodology Workbook Supplement – Wetland Functions and Values, A Descriptive Approach. NAEEP-360-1-30a.
Stream Delineation	OHWM	http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/app_hrgl05-05.pdf	U.S. Army Corps of Engineers. Regulatory Guidance Letter No. 05-05. Ordinary High Water Mark Identification.
	OHWM	http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title33/33cfr328_main_02.tpl	Congressional Federal Register 33 Part 328 Definition of Waters of the United States.
Wetland Indicator Status	GPR 2018 Regional Wetland Plant List	http://wetland-plants.usace.army.mil/nwpl_static/v34/home/home.html	U.S. Army Corps of Engineers. 2018. National Wetland Plant List, Version 3.4. Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH.
Plant Names	USDA PLANTS Database	http://plants.usda.gov/	USDA, NRCS. 2016. The PLANTS Database. National Plant Data Team, Greensboro, NC 27401-4901 USA.

Parameter	Method or Tool	Website	Reference
Soils Data	Soil Survey	Web Soil Survey: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx	Website
Threatened and Endangered Species	USFWS IPAC species lists	https://ecos.fws.gov/ipac/	Website

This appendix includes:

- Figure 1: Site Locations Map
- Figure 2: NWI North Unit
- Figure 3: NWI South unit
- Figure 4: USGS Topography Map – North Unit
- Figure 5: USGS Topography Map – South Unit
- Figure 6: Wetlands and Streams – North Unit
- Figure 7: Wetlands and Streams – South Unit

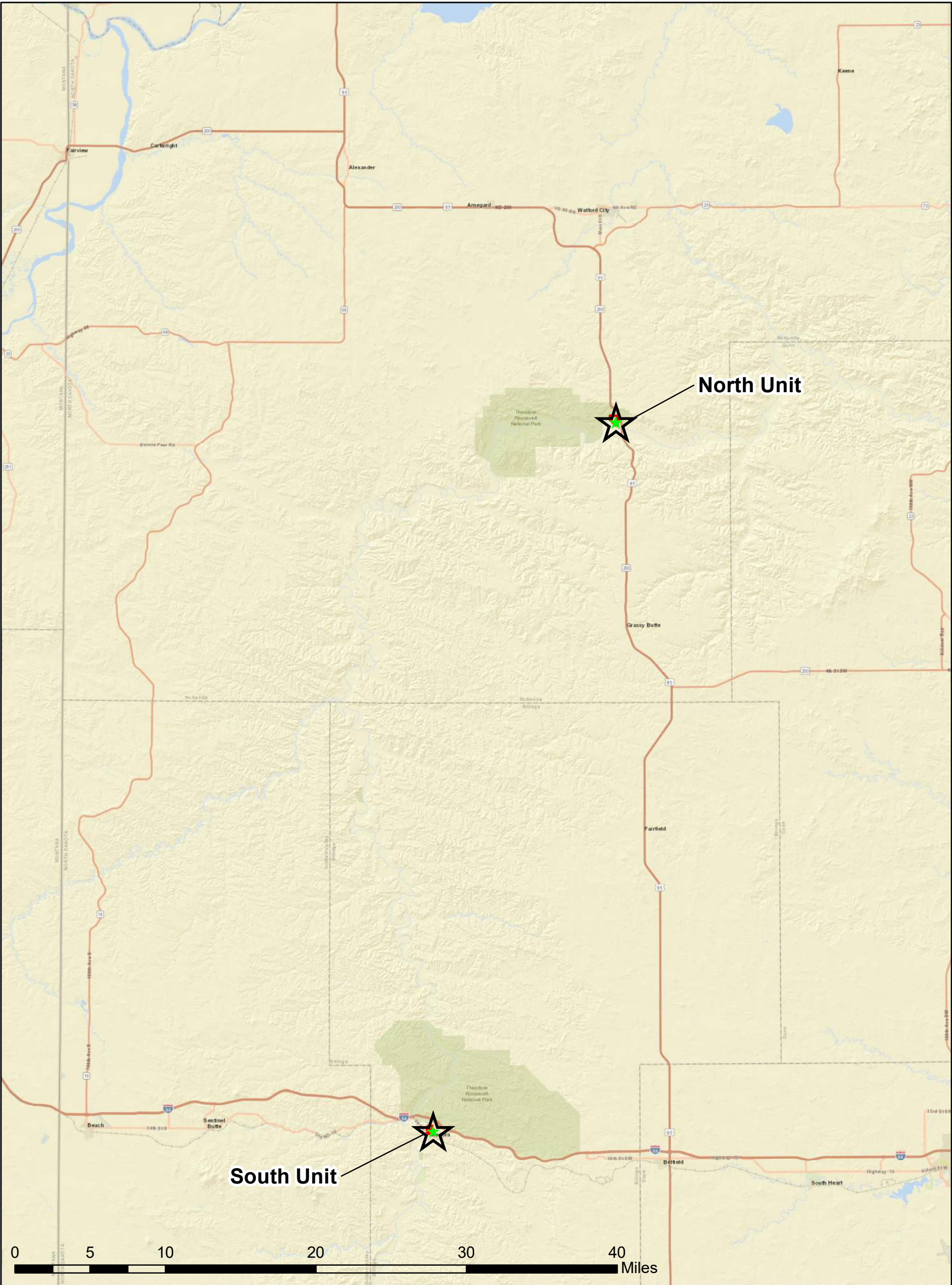


FIGURE 1
SITE LOCATIONS

Legend
★ Approximate Site Locations





FIGURE 2
NORTH UNIT
NWI MAP

Legend



Study Area Boundary

Habitat Type



Freshwater Emergent Wetland



Freshwater Pond



Riverine



FIGURE 3
SOUTH UNIT
NWI MAP

THEODORE ROOSEVELT NATIONAL PARK
NATIONAL PARK SERVICE | NORTH DAKOTA

Legend

 Study Area Boundary

Habitat Type

 Freshwater Emergent Wetland

 Riverine



Otak

0 125 250 500 750 1,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



FIGURE 4
NORTH UNIT
USGS TOPOGRAPHY MAP

Legend


 Study Area Boundary



FIGURE 5
SOUTH UNIT
USGS TOPOGRAPHY MAP

THEODORE ROOSEVELT NATIONAL PARK
NATIONAL PARK SERVICE | NORTH DAKOTA

Legend

 Study Area Boundary



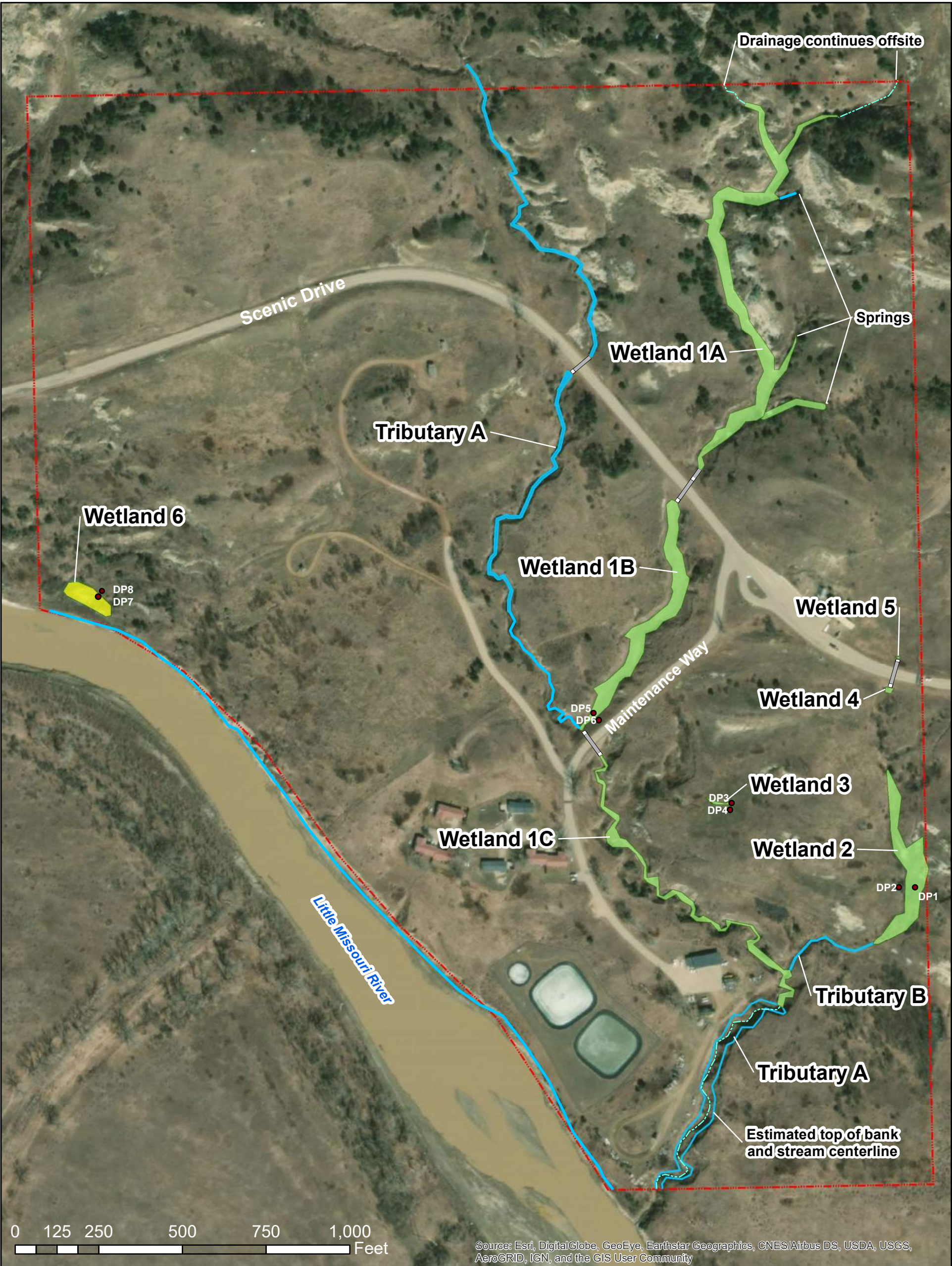


FIGURE 6
NORTH UNIT
WETLANDS AND STREAMS

Legend

- Study Area Boundary
- Streams (OHW)
- Estimated Stream
- Culvert





HabitatType

- PEM1A/B/C
- PAB3H
- Data Points




FIGURE 7
SOUTH UNIT
WETLANDS AND STREAMS

THEODORE ROOSEVELT NATIONAL PARK
NATIONAL PARK SERVICE | NORTH DAKOTA

Legend

-  Study Area Boundary
-  Streams (OHW)
-  Estimated Stream
-  Data Points

Wetland Habitat

-  PFO1A
-  PEM1A
-  PUBJx



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix C

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - North Unit City/County: -/McKenzie Sampling Date: 7/21/20
 Applicant/Owner: NPS State: ND Sampling Point: DP1 - North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): draw Local relief (concave, convex, none): concave Slope (%): 1-2
 Subregion (LRR): LRR G Lat: 47.597652 Long: -103.259020 Datum: WGS 84
 Soil Map Unit Name: Cabbart-Badland complex, 6 to 70 percent slopes NWI classification: No

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u> </u>	Is the Sampled Area within a Wetland?	Yes <u>X</u>	No <u> </u>
Hydric Soil Present?	Yes <u>X</u>	No <u> </u>			
Wetland Hydrology Present?	Yes <u>X</u>	No <u> </u>			
Remarks: DP-1 North located in Wetland 2 in sloping salt flat. All three wetland indicators present.					

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>-</u>				
2. <u> </u>				
3. <u> </u>				
4. <u> </u>				
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15' d.</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u>-</u>				
2. <u> </u>				
3. <u> </u>				
4. <u> </u>				
5. <u> </u>				
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5' d.</u>)				Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Puccinellia nuttalliana</u>	<u>75</u>	<u>Yes</u>	<u>OBL</u>	
2. <u>Stipa sp.</u>	<u>2</u>	<u>No</u>	<u>NL</u>	
3. <u> </u>				
4. <u> </u>				
5. <u> </u>				
6. <u> </u>				
7. <u> </u>				
8. <u> </u>				
9. <u> </u>				
10. <u> </u>				
<u>77</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15' d.</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>				
2. <u> </u>				
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>23</u> (salt flat)				
Remarks: Hydrophytic vegetation indicator present.				

SOIL

Sampling Point: DP1-North

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

Depth (inches)	Matrix		Redox Features			Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹		
0-16	10YR 3/2	50	10YR 4/1	6	d	m	silty clay
	10YR 3/1	40	10YR 5/6	4	c	m	dense, concentrations to surface

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

- | | |
|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input checked="" type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) |

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes ☒ No _____

Remarks:

Hydric soil indicator F6 (redox dark surface) observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input checked="" type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Salt Crust (B11) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): .5 (in pockets)
Water Table Present? Yes ☒ No _____ Depth (inches): 8"
Saturation Present? Yes ☒ No _____ Depth (inches): surface
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

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

Remarks:

Primary wetland hydrology indicators A1, A2, A3, and B11 present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - North Unit City/County: -McKenzie Sampling Date: 7/21/20
 Applicant/Owner: NPS State: ND Sampling Point: DP2-North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 10
 Subregion (LRR): LRR G Lat: 47.597773 Long: -103.259193 Datum: WGS 84
 Soil Map Unit Name: Cabbart-Badland complex, 6 to 70 percent slopes NWI classification: No

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: DP2-North located in uplands on hillslope above salt flat (Wetland 2). No wetland indicators present.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u>-</u>				
2. <u> </u>				
3. <u> </u>				
4. <u> </u>				
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15' d.</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u>-</u>				
2. <u> </u>				
3. <u> </u>				
4. <u> </u>				
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5' d.</u>)				Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation <u> </u> 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Asclepias speciosa</u>	<u>5</u>	<u>No</u>	<u>FAC</u>	
2. <u>Mellilotus officinalis</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>	
3. <u>Ratibida columnifera</u>	<u>3</u>	<u>No</u>	<u>UPL/NL</u>	
4. <u>Apocynum androsaemifolium</u>	<u>2</u>	<u>No</u>	<u>UPL</u>	
5. <u>Agropyron cristatum</u>	<u>50</u>	<u>Yes</u>	<u>UPL/NL</u>	
6. <u>Poa pratensis</u>	<u>10</u>	<u>No</u>	<u>FACU</u>	
7. <u>Echinacea angustifolia</u>	<u>5</u>	<u>No</u>	<u>UPL/NL</u>	
8. <u> </u>				
9. <u> </u>				
<u>95</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15' d.</u>)				Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u>-</u>				
2. <u> </u>				
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>5</u>				
Remarks: No hydrophytic vegetation indicators present.				

SOIL

Sampling Point: DP2-North

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

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

Indicators for Problematic Hydric Soils³:

- | | | |
|---|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | ³ Indicators of hydrophytic vegetation and |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) | wetland hydrology must be present, |

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
 (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ^X _____ Depth (inches): _____

Water Table Present? Yes _____ No ^x _____ Depth (inches): _____

Saturation Present? Yes _____ No ^x _____ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

No wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - North Unit City/County: -McKenzie Sampling Date: 7/21/20
 Applicant/Owner: NPS State: ND Sampling Point: DP3-North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 1-2
 Subregion (LRR): LRR G Lat: 47.598156 Long: -103.261363 Datum: WGS 84
 Soil Map Unit Name: Cabbart-Kremlin-Boxwell loams, 9-40 percent slopes, slumped NWI classification: no

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: DP3-North located in hillside depression with groundwater seep (Wetland 3). All three wetland indicators present.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. -				
2. _____				
3. _____				
4. _____				
0 = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. -				
2. _____				
3. _____				
4. _____				
5. _____				
0 = Total Cover				
Herb Stratum (Plot size: <u>5' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Elocharis palustris</u>	90	Yes	OBL	
2. <u>Cirsium arvense</u>	4	No	FACU	
3. <u>Elymus smithii</u>	4	No	FACU	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
98 = Total Cover				
Woody Vine Stratum (Plot size: <u>15' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <u>X</u> No _____
1. -				
2. _____				
0 = Total Cover				
% Bare Ground in Herb Stratum <u>2 (mud)</u>				
Remarks: Hydrophytic vegetation indicator present (Dominance Test).				

SOIL

Sampling Point: DP3-North

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/2	85	10YR 4/2	10	d	m	clay	dense clay
			10YR 5/6	5	c	m		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

- | | |
|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input checked="" type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) |

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil indicator F6 (Redox Dark Surface) present. Dense clay in isolated depression with groundwater.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input checked="" type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 0
Water Table Present? Yes ☒ No ☐ Depth (inches): 0
Saturation Present? Yes ☐ No ☐ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Primary (A1 and A3) wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - North Unit City/County: -/McKenzie Sampling Date: 7/21/20
 Applicant/Owner: NPS State: ND Sampling Point: DP4-North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 2-4
 Subregion (LRR): _____ Lat: 47.598147 Long: -103.261306 Datum: WGS 84
 Soil Map Unit Name: Cabbart-Kremlin-Boxwell loams, 9-40 percent slopes, slumped NWI classification: no

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 <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks: DP4-North approximately 2-3 feet above and 10 feet south of groundwater seep and surface depression (Wetland 3). No wetland indicators present.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u> d.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u> d.) 1. <u>Artemisia longifolia</u> 10 Yes NL (UPL)				
2. _____				
3. _____				
4. _____				
_____ = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Herb Stratum (Plot size: <u>5'</u> d.) 1. <u>Elymus smithii</u> 35 Yes FACU				
2. <u>Agropyron cristatum</u> 20 Yes NL (UPL)				
3. <u>Poa pratensis</u> 15 Yes FACU				
4. <u>Achillea millefolium</u> 4 No FACU				
5. <u>Opuntia polyacantha</u> 4 No NL (UPL)				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
_____ = Total Cover				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>
Woody Vine Stratum (Plot size: <u>15'</u> d.) 1. _____				
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>22</u> (dirt)				
Remarks: No hydrophytic vegetation indicator present.				

SOIL

Sampling Point: DP4-North

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 3/3	65	-	-	-	-	clay loam	dry; compact/dense at 14"
	10YR 3/2	35						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

- | | |
|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) |

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No ^X _____

Remarks:

No hydro soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No ^X _____

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

Remarks:

No wetland hydrology indicators observed. DP4-North located 2-3 feet above Wetland 3.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - North Unit City/County: -/McKenzie Sampling Date: 7/21/20
 Applicant/Owner: NPS State: ND Sampling Point: DP5-North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): none (linear depression) Slope (%): 2-4
 Subregion (LRR): LRR G Lat: 47.599007 Long: -103.262756 Datum: WGS 84
 Soil Map Unit Name: Patent loam, 0 to 6 percent slopes, occasionally flooded NWI classification: PEM

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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: DP5-North located in drainage (Wetland 1B) west of Maintenance Way. All three wetland indicators present.			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u> d.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>-</u>				
2. <u>-</u>				
3. <u>-</u>				
4. <u>-</u>				
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
Sapling/Shrub Stratum (Plot size: <u>15'</u> d.)				
1. <u>-</u>				
2. <u>-</u>				
3. <u>-</u>				
4. <u>-</u>				Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>-</u>				
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u> d.)				
1. <u>Shoenoplectus pungens</u>	Yes	50	OBL	
2. <u>Carex athrostachya</u>	No	10	FACW	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
3. <u>Triglochin maritima</u>	No	4	OBL	
4. <u>Distichlis spicata</u>	No	8	FACW	
5. <u>Bromus inermis</u>	No	5	UPL	
6. <u>Stipa comata</u>	No	2	UPL	
7. <u>-</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
8. <u>-</u>				
9. <u>-</u>				
10. <u>-</u>				
<u>79</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u> d.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. <u>-</u>				
2. <u>-</u>				
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>21</u> (mud)				
Remarks: Hydrophytic vegetation indicator present (Dominance Test).				

SOIL

Sampling Point: DP5-North

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

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

Indicators for Problematic Hydric Soils³:

- | | | |
|---|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input checked="" type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | ³ Indicators of hydrophytic vegetation and |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) | wetland hydrology must be present, |

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No

Remarks:

Hydric soil indicator F3 (Depleted Matrix) observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input checked="" type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Salt Crust (B11) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes x No Depth (inches): 0.5

Water Table Present? Yes ^x No _____ Depth (inches): 0 _____

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

Wetland Hydrology Present? Yes ^x No

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

Remarks:

Flowing water in drainage channel. Wetland hydrology indicators A1, A2, A3, B2, B11, and B10 observed.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO-North Unit City/County: -/McKenzie Sampling Date: 7/21/20
 Applicant/Owner: NPS State: ND Sampling Point: DP6-North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): road embankment Local relief (concave, convex, none): none Slope (%): 8-10
 Subregion (LRR): LRR G Lat: 47.598949 Long: -103.262691 Datum: WGS 84
 Soil Map Unit Name: Patent loam, 0 to 6 percent slopes, occasionally flooded NWI classification: no

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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: DP6-North located in uplands on road embankment above drainage (Wetland 1B). No wetland indicators present.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u> d.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u>-</u>				
2. <u>-</u>				
3. <u>-</u>				
4. <u>-</u>				
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u>0</u> Multiply by: <u>1</u> OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = <u>0</u>
Sapling/Shrub Stratum (Plot size: <u>15'</u> d.)				
1. <u>-</u>				
2. <u>-</u>				
3. <u>-</u>				
4. <u>-</u>				
5. <u>-</u>				
<u>0</u> = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Herb Stratum (Plot size: <u>5'</u> d.)				
1. <u>Bromus inermis</u>	<u>65</u>	<u>Yes</u>	<u>UPL</u>	
2. <u>Agropyron cristatum</u>	<u>12</u>	<u>No</u>	<u>UPL/NL</u>	
3. <u>Stipa comata</u>	<u>4</u>	<u>No</u>	<u>UPL</u>	
4. <u>Elymus smithii</u>	<u>15</u>	<u>No</u>	<u>FACU</u>	
5. <u>Melilotus officinalis</u>	<u>4</u>	<u>No</u>	<u>FACU</u>	
6. <u>-</u>				
7. <u>-</u>				
8. <u>-</u>				
9. <u>-</u>				
10. <u>-</u>				
<u>100</u> = Total Cover				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Woody Vine Stratum (Plot size: <u>15'</u> d.)				
1. <u>-</u>				
2. <u>-</u>				
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: No hydrophytic vegetation indicators present.				

SOIL

Sampling Point: DP6-North

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 3/3	25	-	-	-	-	loam	dry, compact
	10YR 4/3	75						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

- | | |
|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) |

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No ^X _____

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No ^X _____

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

Remarks:

No wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - North Unit City/County: -/McKenzie Sampling Date: 7/22/20
 Applicant/Owner: NPS State: ND Sampling Point: DP7-North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): Hillslope/floodplain Local relief (concave, convex, none): concave Slope (%): 1-2
 Subregion (LRR): LRR G Lat: 47.600029 Long: -103.268818 Datum: WGS 84
 Soil Map Unit Name: Cabbart-Kremlin-Bowell loams, 9 to 50 percent slopes, slumped NWI classification: no

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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: DP7-North located adjacent to ponded area near the Little Missouri River. All three wetland indicators present.			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u> d.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>-</u>				
2. <u>-</u>				
3. <u>-</u>				
4. <u>-</u>				
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u> d.) 1. <u>-</u> 2. <u>-</u> 3. <u>-</u> 4. <u>-</u> 5. <u>-</u>				
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u> d.) 1. <u>Eleocharis palustris</u> Yes 35 OBL 2. <u>Carex athrostachya</u> No 5 FACW 3. <u>-</u> 4. <u>-</u> 5. <u>-</u> 6. <u>-</u> 7. <u>-</u> 8. <u>-</u> 9. <u>-</u> 10. <u>-</u>				
<u>40</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u> d.) 1. <u>-</u> 2. <u>-</u>				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>60</u> (matted veg.)				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Remarks: Hydrophytic vegetation indicator present (Dominance Test).				

SOIL

Sampling Point: DP7-North

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

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

Indicators for Problematic Hydric Soils³:

- | | | |
|---|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input checked="" type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | ³ Indicators of hydrophytic vegetation and |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) | wetland hydrology must be present, |

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No

Remarks:

Hydric soil indicator F3 (Depleted Matrix) observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input checked="" type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
 (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes x No Depth (inches): adjacent

Water Table Present? Yes ^x No _____ Depth (inches): 5

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

Wetland Hydrology Present? Yes x No

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

Remarks:

Ponded water adjacent. Wetland hydrology indicators A1, A2, and A3 observed.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO-North Unit City/County: -/McKenzie Sampling Date: 7/22/20
 Applicant/Owner: NPS State: ND Sampling Point: DP8-North
 Investigator(s): Jeff Gray Section, Township, Range: S35, T148N, R099W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 5
 Subregion (LRR): LRR G Lat: 47.600061 Long: -103.268777 Datum: WGS 84
 Soil Map Unit Name: Cabbart-Kremlin-Bowell loams, 9 to 50 percent slopes, slumped NWI classification: no

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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: DP8-North located on hillside above ponded area. No wetland indicators present.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20</u> (A/B)
1. <u>Ulmus americana</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Juniperus communis</u>	<u>3</u>	<u>Yes</u>	<u>UPL</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>8</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15' d.</u>)				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. <u>Symphoricarpos occidentalis</u>	<u>8</u>	<u>Yes</u>	<u>UPL</u>	
2. <u>Rosa woodsii</u>	<u>4</u>	<u>Yes</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>12</u> = Total Cover				
Herb Stratum (Plot size: <u>5' d</u>)				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Bromus inermis</u>	<u>5</u>	<u>No</u>	<u>UPL</u>	
2. <u>Agropyron cristatum</u>	<u>5</u>	<u>No</u>	<u>UPL/NL</u>	
3. <u>Euphorbia esula</u>	<u>50</u>	<u>Yes</u>	<u>NL/UPL</u>	
4. <u>Poa pratensis</u>	<u>15</u>	<u>No</u>	<u>FACU</u>	
5. <u>Melilotus officinalis</u>	<u>5</u>	<u>No</u>	<u>FACU</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>80</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15' d.</u>)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>20</u>				
Remarks: No hydrophytic vegetation indicators present.				

SOIL

Sampling Point: DP8-North

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

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

Indicators for Problematic Hydric Soils³:

- | | | |
|---|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | ³ Indicators of hydrophytic vegetation and |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) | wetland hydrology must be present, |

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ^X_____

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
 (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes No ^X Depth (inches):

Water Table Present? Yes _____ No ^x _____ Depth (inches): _____

Saturation Present? Yes _____ No ^x_____ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

No wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO South Unit City/County: Medora/Billings Sampling Date: 7/20/20
 Applicant/Owner: NPS State: ND Sampling Point: DP1-South
 Investigator(s): Jeff Gray Section, Township, Range: S27, T140N, R102W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 1-2
 Subregion (LRR): LRR G Lat: 46.916679 Long: -103.525852 Datum: WGS 84
 Soil Map Unit Name: Havre silt loam, 0-2 percent slopes, occasionally flooded NWI classification: no

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			
Remarks: DP1-South located in Wetland 1 at stormwater outfall from visitor center parking lot in cottonwood stand in Little Missouri River floodplain. All three wetland indicators present.					

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>6</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>Populus deltoides</u>	<u>35</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Fraxinus pennsylvanica</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>55</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. <u>Fraxinus pennsylvanica</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Cornus sericea</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>	
3. <u>Rosa woodsii</u>	<u>5</u>	<u>No</u>	<u>FACU</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>_____</u> = Total Cover				
Herb Stratum (Plot size: <u>5' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Poa palustris</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>	
2. <u>Carex sp.*</u>	<u>50</u>	<u>Yes</u>	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>70</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <u>X</u> No _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>30</u> (mud)				

Remarks:

*No seed head observed so unable to identify to species. Sedge assumed to be FACW or wetter due to saturated growing conditions and ponding nearby. Hydrophytic vegetation indicator present (Dominance Test).

SOIL

Sampling Point: DP1-South

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	10YR 3/2	80					clay	dense clay, saturated @ 4"
	10Yr 4/2	20						
8-16	10YR 4/2	90	10YR 4/6	4	c	PL	clay	
			10Yr 4/1	6	d	M		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (**LRR F**)
☐ 1 cm Muck (A9) (**LRR F, G, H**)
☒ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
☐ Dark Surface (S7) (**LRR G**)
☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
☐ Reduced Vertic (F18)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No _____

Remarks:

Hydric soil indicator A11(depleted below dark surface) observed.

HYDROLOGY

Wetland Hydrology Indicators:Primary Indicators (minimum of one 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)
- ☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Dry-Season Water Table (C2)
☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
☐ Presence of Reduced Iron (C4)
☐ 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)
☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ FAC-Neutral Test (D5)
☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
 Water Table Present? Yes ☒ No _____ Depth (inches): 5"
 Saturation Present? Yes ☒ No _____ Depth (inches): 4"
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

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

Remarks:

Primary wetland hydrology indicators A2, A3 and B9 observed. Surface water ponding nearby in linear depression next to stormwater outfall.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - South Unit City/County: Medora/Billings Sampling Date: 7/20/20
 Applicant/Owner: NPS State: ND Sampling Point: DP2-South
 Investigator(s): Jeff Gray Section, Township, Range: S27, T140 N, R102 W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0-1
 Subregion (LRR): LRR G Lat: 46.916896 Long: -103.525745 Datum: WGS 84
 Soil Map Unit Name: Havre silt loam, 0-2 percent slopes, occasionally flooded NWI classification: No

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes _____ No <u>X</u>	
Remarks: DP2-South located in upland north of Wetland 1 and visitor center in cottonwood stand in Little Missouri River floodplain. Not all three wetland indicators present.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60</u> (A/B)
1. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Populus deltoides</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>40</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15' d.</u>)				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. <u>Fraxinus pennsylvanica</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Symphoricarpos occidentalis</u>	<u>30</u>	<u>Yes</u>	<u>UPL</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>55</u> = Total Cover				
Herb Stratum (Plot size: <u>5' d.</u>)				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Bromus inermis</u>	<u>40</u>	<u>Yes</u>	<u>UPL</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>40</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15' d.</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>60</u>				
Remarks: Hydrophytic vegetation indicator present (Dominance Test).				

SOIL

Sampling Point: DP2-South

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	2.5Y 4/3	80	-	-	-	-	clay	no redox features
	2.5Y 5/3	20						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

- | | |
|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) |

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

No wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: THRO - South Unit City/County: Medora/Billings Sampling Date: 7/20/20
 Applicant/Owner: NPS State: ND Sampling Point: DP3-South
 Investigator(s): Jeff Gray Section, Township, Range: S27, T140 N, R102 W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 1-2
 Subregion (LRR): LRR G Lat: 46.916547 Long: -103.524150 Datum: WGS 84
 Soil Map Unit Name: Havre silt loam, 0-2 percent slopes, occasionally flooded NWI classification: No

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: DP3-South located in upland grass swale east of East River Road near maintenance building. Not all three wetland indicators present.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' d.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u>-</u>				
2. <u> </u>				
3. <u> </u>				
4. <u> </u>				
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
Sapling/Shrub Stratum (Plot size: <u>15' d.</u>) 1. <u>-</u> 2. <u> </u> 3. <u> </u> 4. <u> </u> 5. <u> </u> <u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5' d.</u>) 1. <u>Bromus inermis</u> 95 Yes UPL 2. <u>Poa pratensis</u> 5 No FACU 3. <u> </u> 4. <u> </u> 5. <u> </u> 6. <u> </u> 7. <u> </u> 8. <u> </u> 9. <u> </u> 10. <u> </u> <u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15' d.</u>) 1. <u>-</u> 2. <u> </u> <u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: No hydrophytic vegetation indicator present (Dominance Test). Plot dominated by smooth brome (UPL).				Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation <u> </u> 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>				

SOIL

Sampling Point: DP3-South

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 3/2	70	-	-	-	-	clay	no redox features
	2.5 Y 4/3	30						
10-12	10YR 4/2	96	10YR 4/6	4	c	m	clay	
12-16	2.5Y 4/3	100	-	-	-	-	silty clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

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

- | | |
|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | (MLRA 72 & 73 of LRR H) |

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

No hydric soil indicators present. Depleted layer at 10" below ground surface but doesn't meet the thickness requirement (6") for indicator F3 or A11.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | (where not tilled) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No X

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

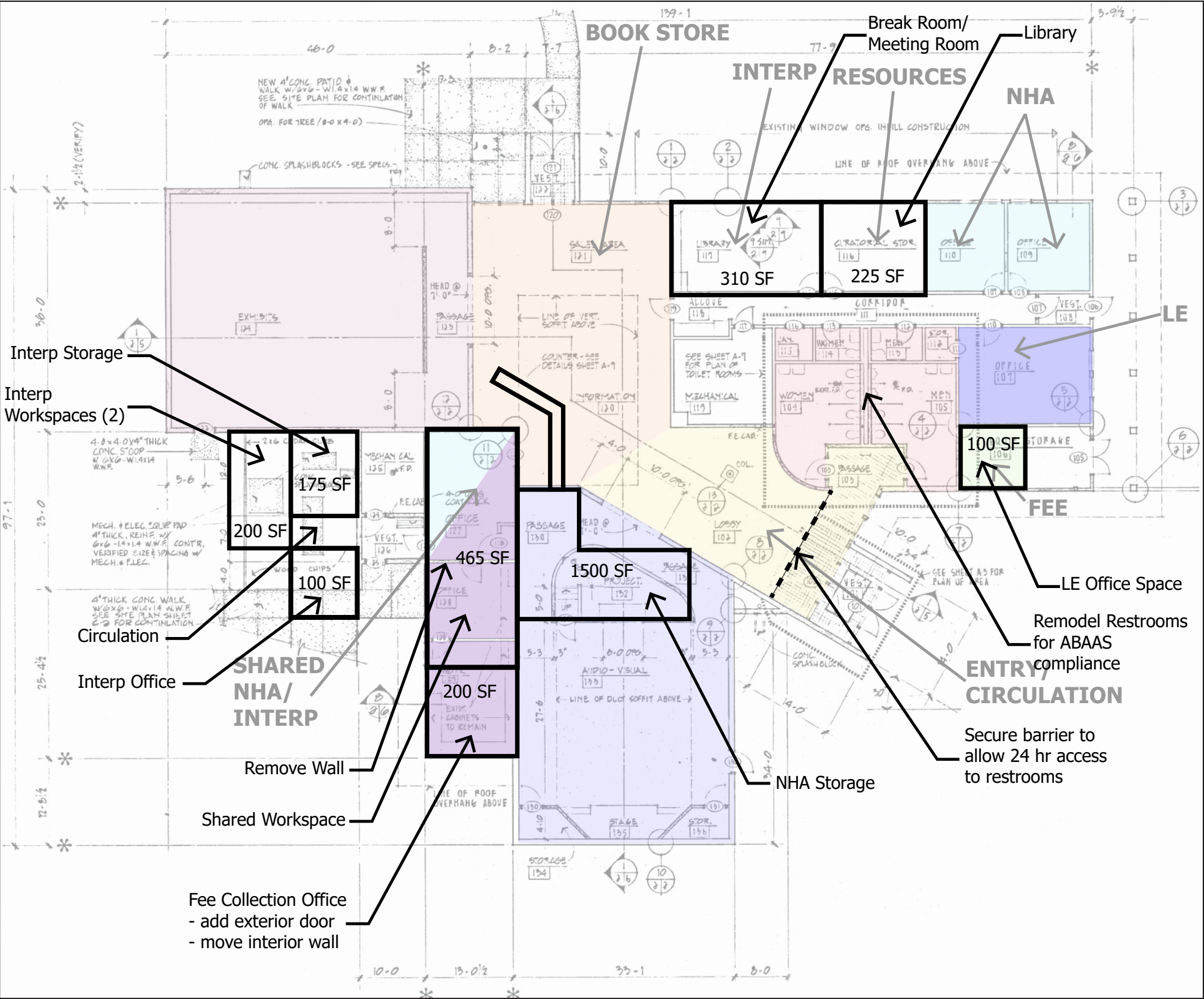
Remarks:

No wetland hydrology indicators present.

APPENDIX D

FACILITY DIAGRAMS

FIGURE D.1 MEDORA AREA VISITOR CENTER REMODEL FACILITY DIAGRAM (CONCEPT A & B)



Facility Revitalization Plan
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Legend

- Museum
- Book Store
- Entry/Circulation
- Theater
- Restrooms
- LE
- FEE
- NHA
- Interp

- Medora Visitor Center Facility Needs:
- 1 Private Office for Fee Collection
 - Expanded Shared Workspace at Desk
 - 1 Private Office and Storage for Interp
 - 1 Storage Room for NHA
 - Meeting Room/ Breakroom
 - Expanded, Secured, Curatorial Space
 - Sight Lines from the Desk to Entry
 - First Aide Station
 - Storm Shelter?

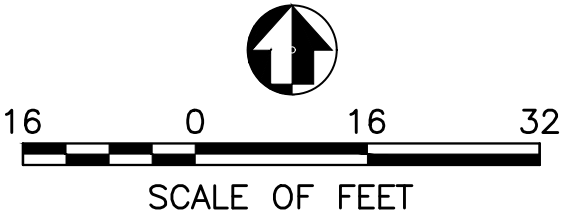


FIGURE D.2 MEDORA AREA NEW VISITOR CENTER/ ADMIN BUILDING FACILITY DIAGRAM (CONCEPT C)

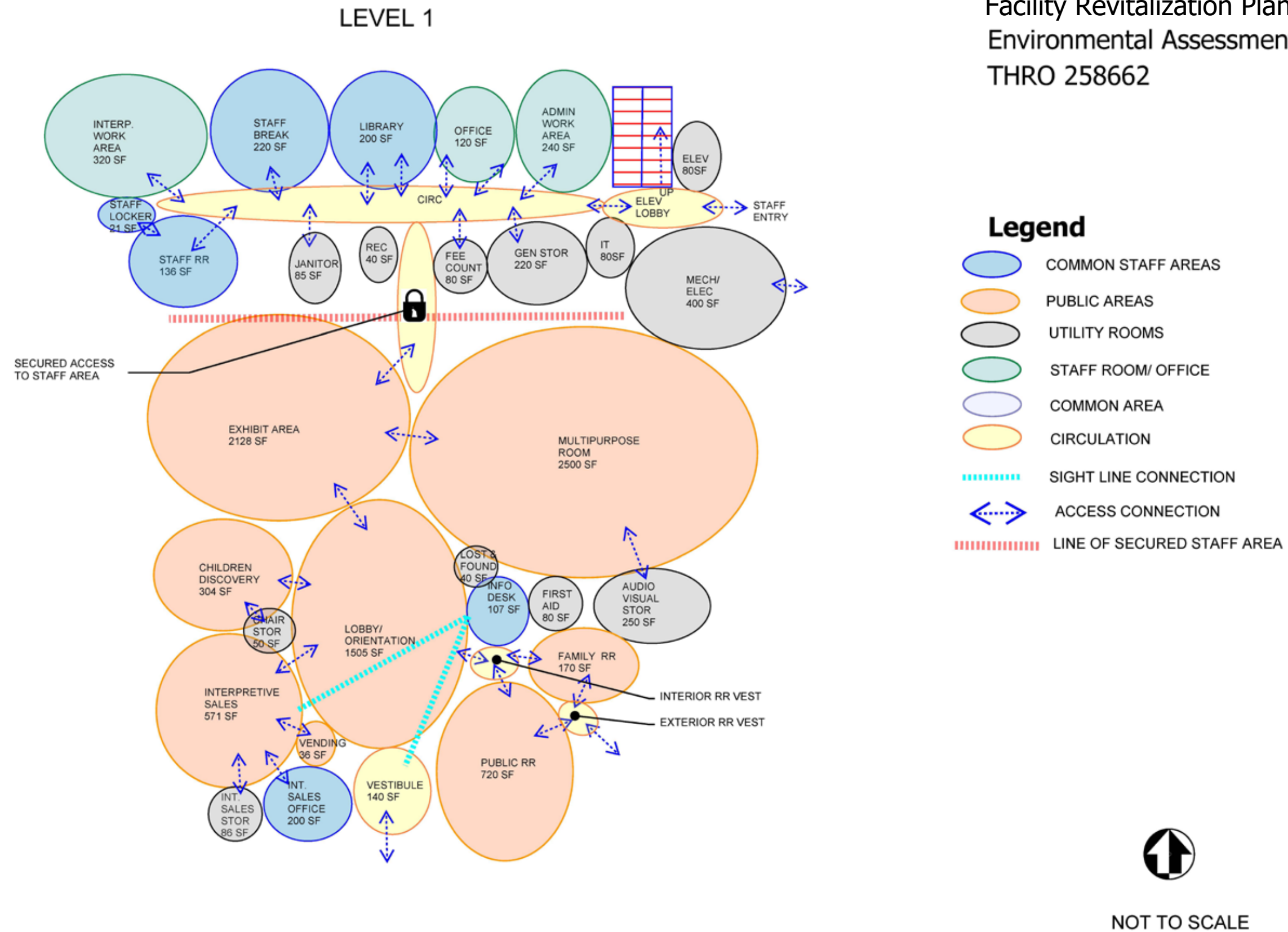
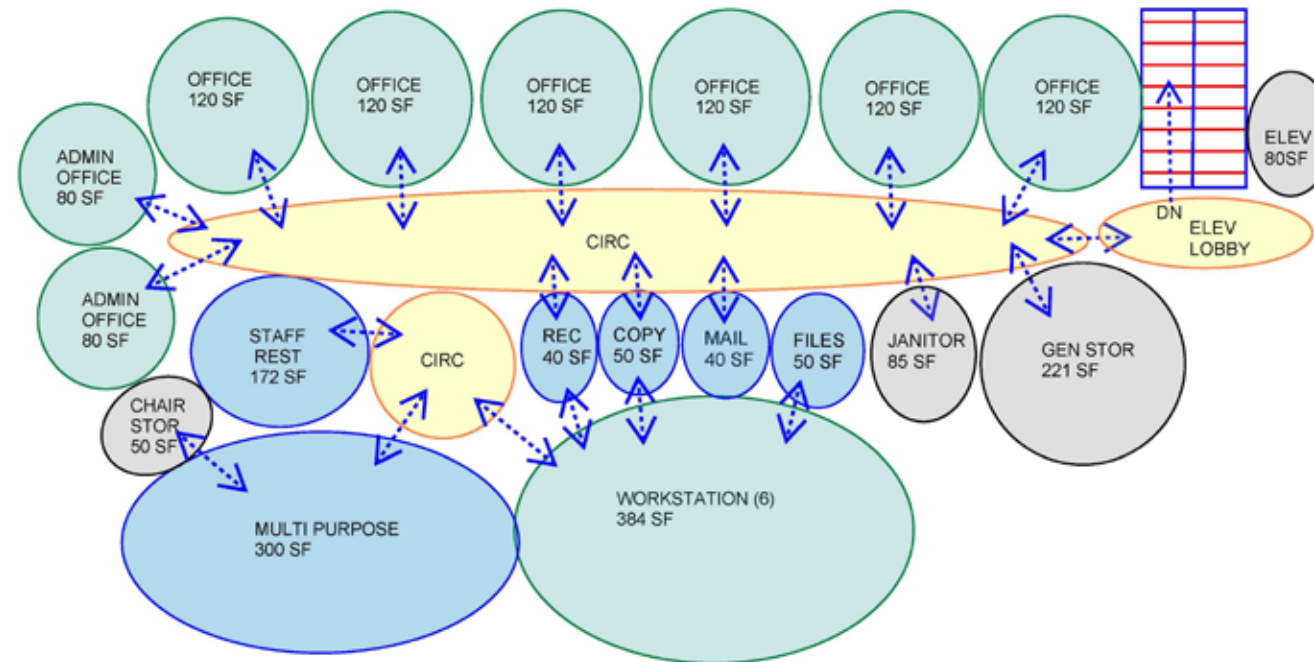











FIGURE D.3 MEDORA AREA NEW VISITOR CENTER/ ADMIN BUILDING FACILITY DIAGRAM (CONCEPT C)

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LEVEL 2



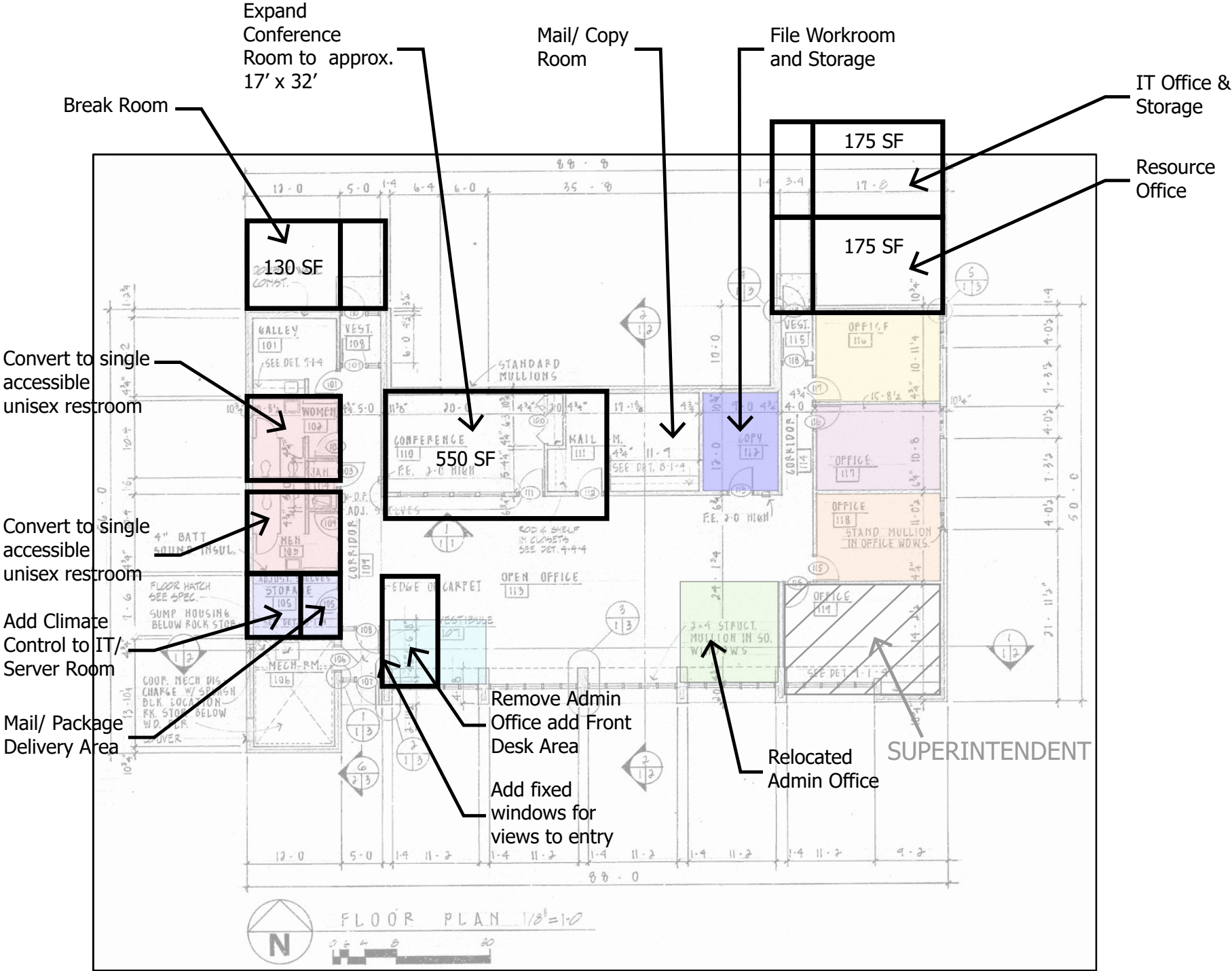
Legend

- | | |
|---|----------------------------|
|  | COMMON STAFF AREAS |
|  | PUBLIC AREAS |
|  | UTILITY ROOMS |
|  | STAFF ROOM/ OFFICE |
|  | COMMON AREA |
|  | CIRCULATION |
|  | SIGHT LINE CONNECTION |
|  | ACCESS CONNECTION |
|  | LINE OF SECURED STAFF AREA |



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FIGURE D.4 MEDORA AREA ADMIN BUILDING REMODEL FACILITY DIAGRAM (CONCEPT A)



Facility Revitalization Plan
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Legend

- Interpretation/ Education
- LE
- Facilities
- Restrooms
- Server and Switches
- IT Office and Storage
- Resources
- Administration

- Admin Building Facility Needs Summary:
- 1 Additional Room (File Workroom)
 - Fully Climate Controlled IT Room
 - Break Room
 - Expanded or Expandable Conference Room, and Storage
 - Accessible Restrooms
 - Clear View of Building Approach from Front Desk
 - Mail/ Package Delivery Area
 - Additional Restroom near Offices
 - Secure space for IDs, Keys, Badges
 - Collaboration Room (from Wendy's Office)
 - Waiting Area

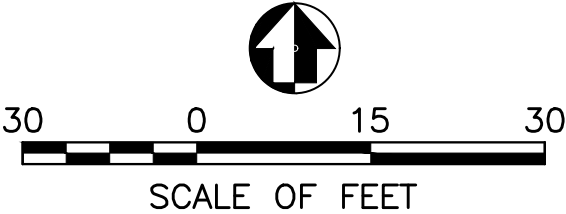


FIGURE D.5 MEDORA AREA NEW ADMIN BUILDING FACILITY DIAGRAM (CONCEPT B)

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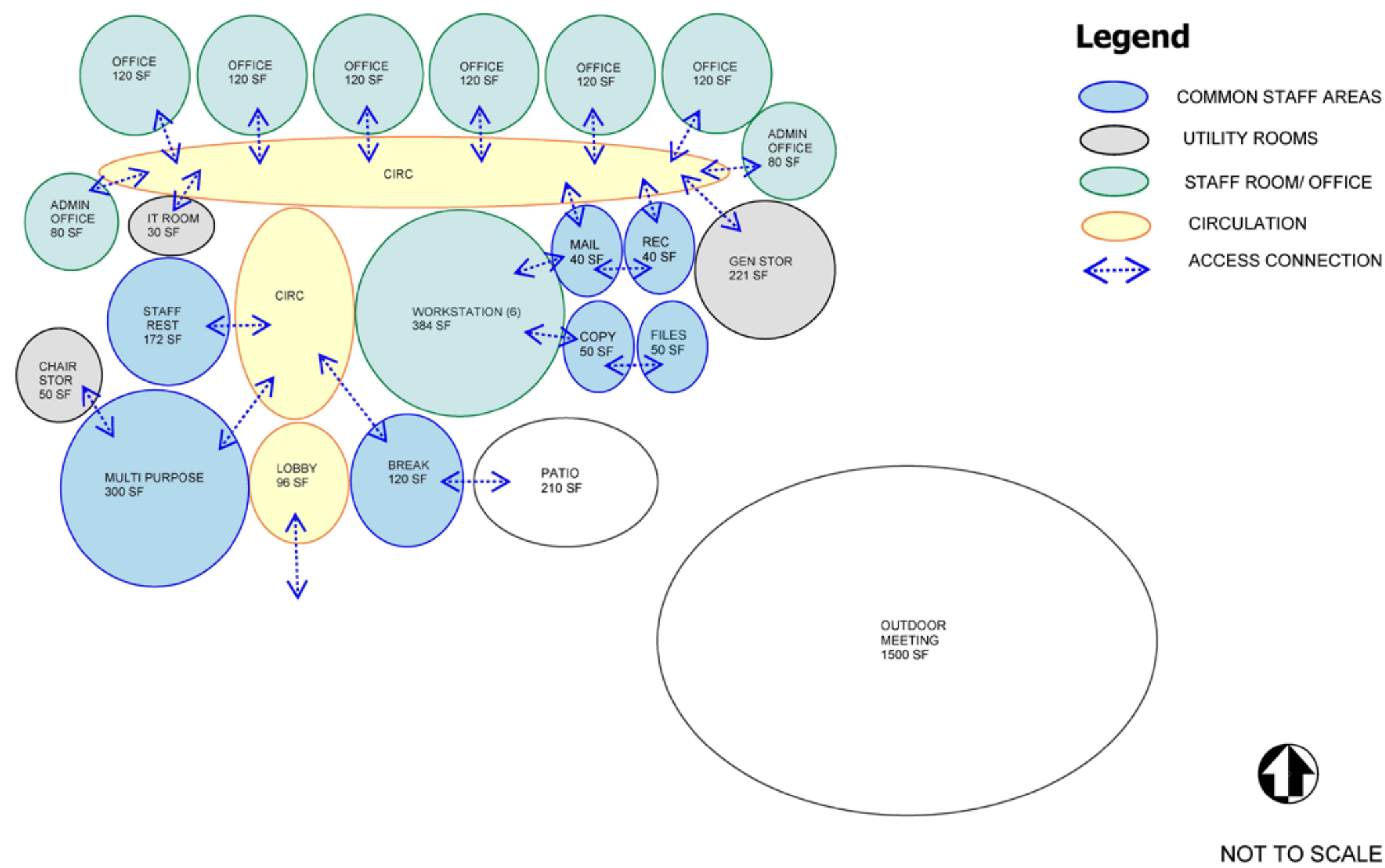


FIGURE D.6 MEDORA AREA HEATED MAINTENANCE BUILDING FACILITY DIAGRAM (CONCEPTS A & B)

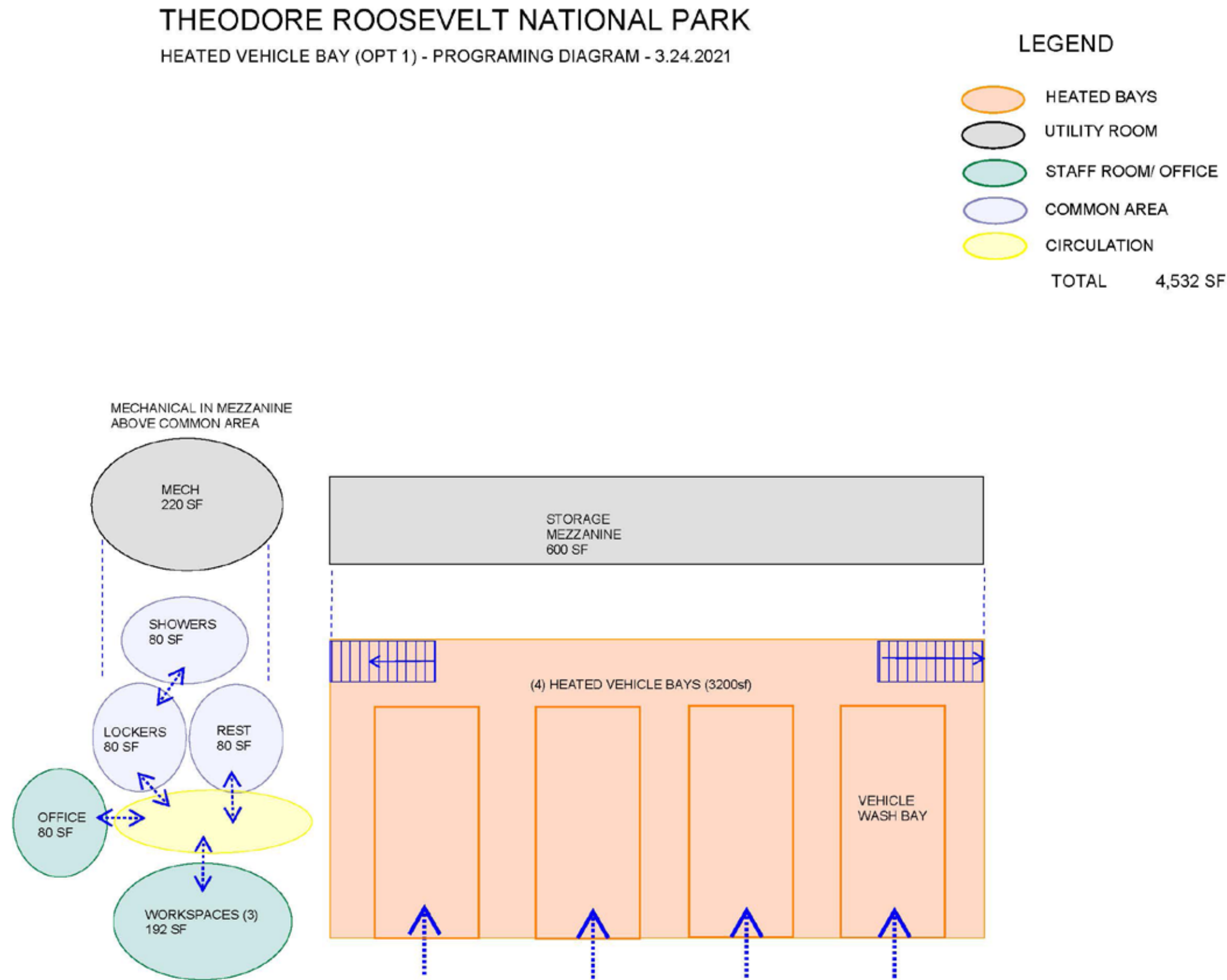


FIGURE D.7 MEDORA AREA HEATED MAINTENANCE BUILDING FACILITY DIAGRAM (CONCEPT C)

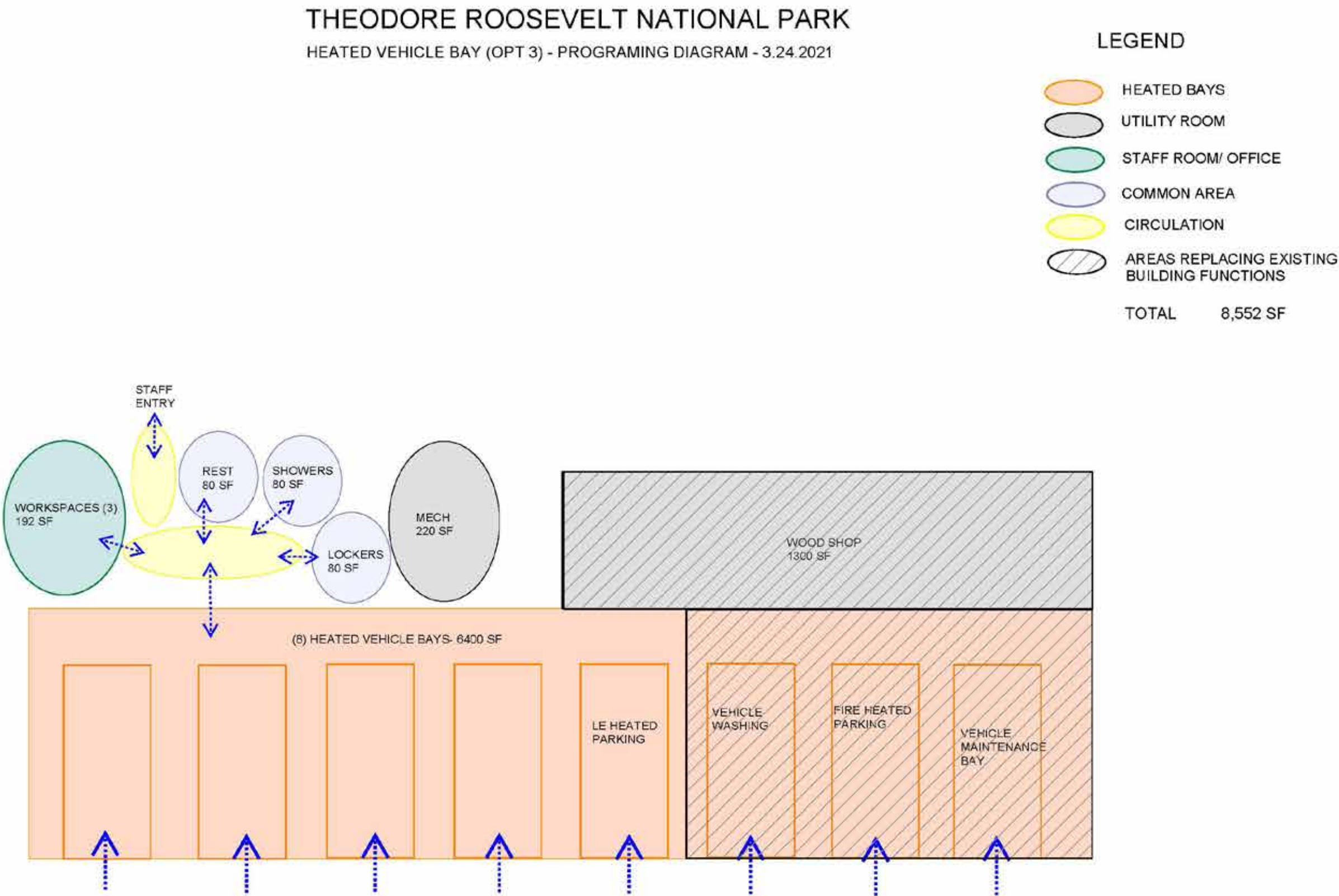
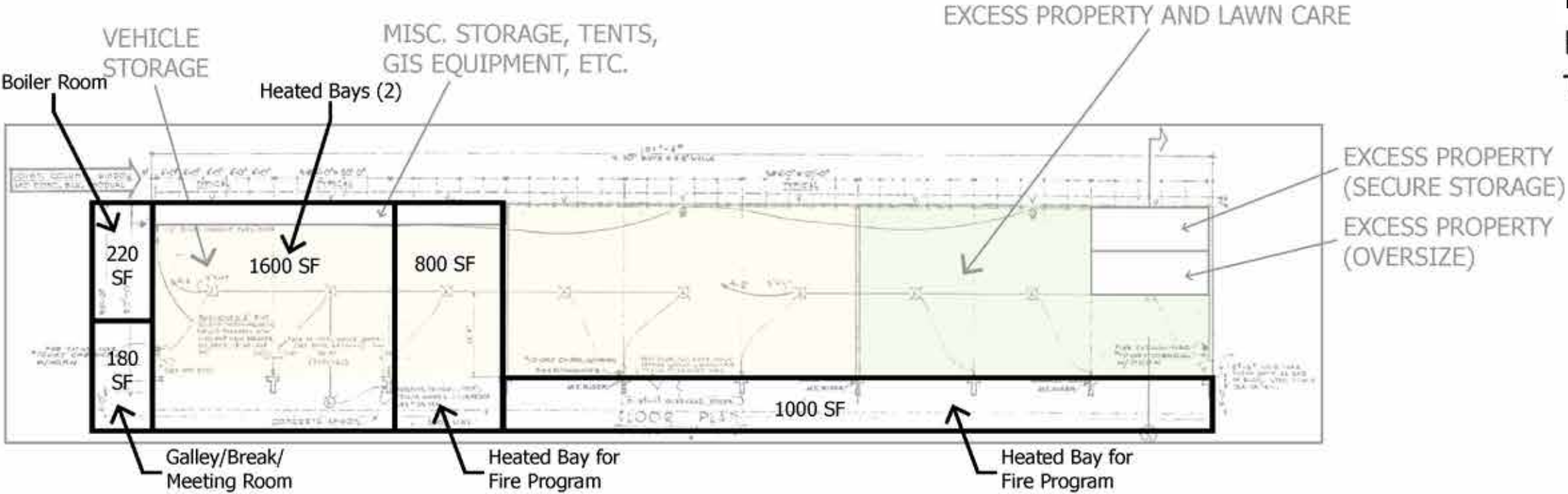


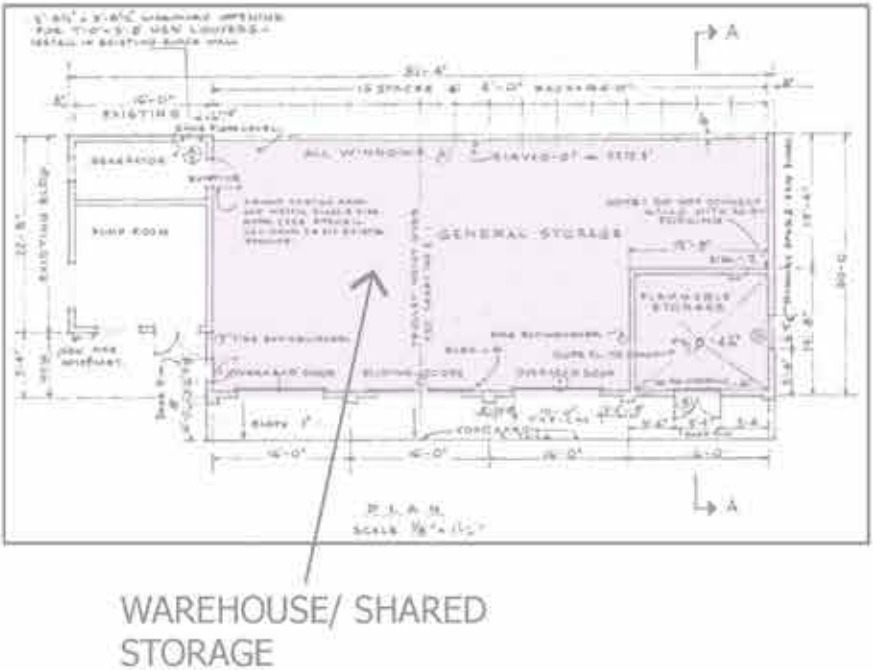
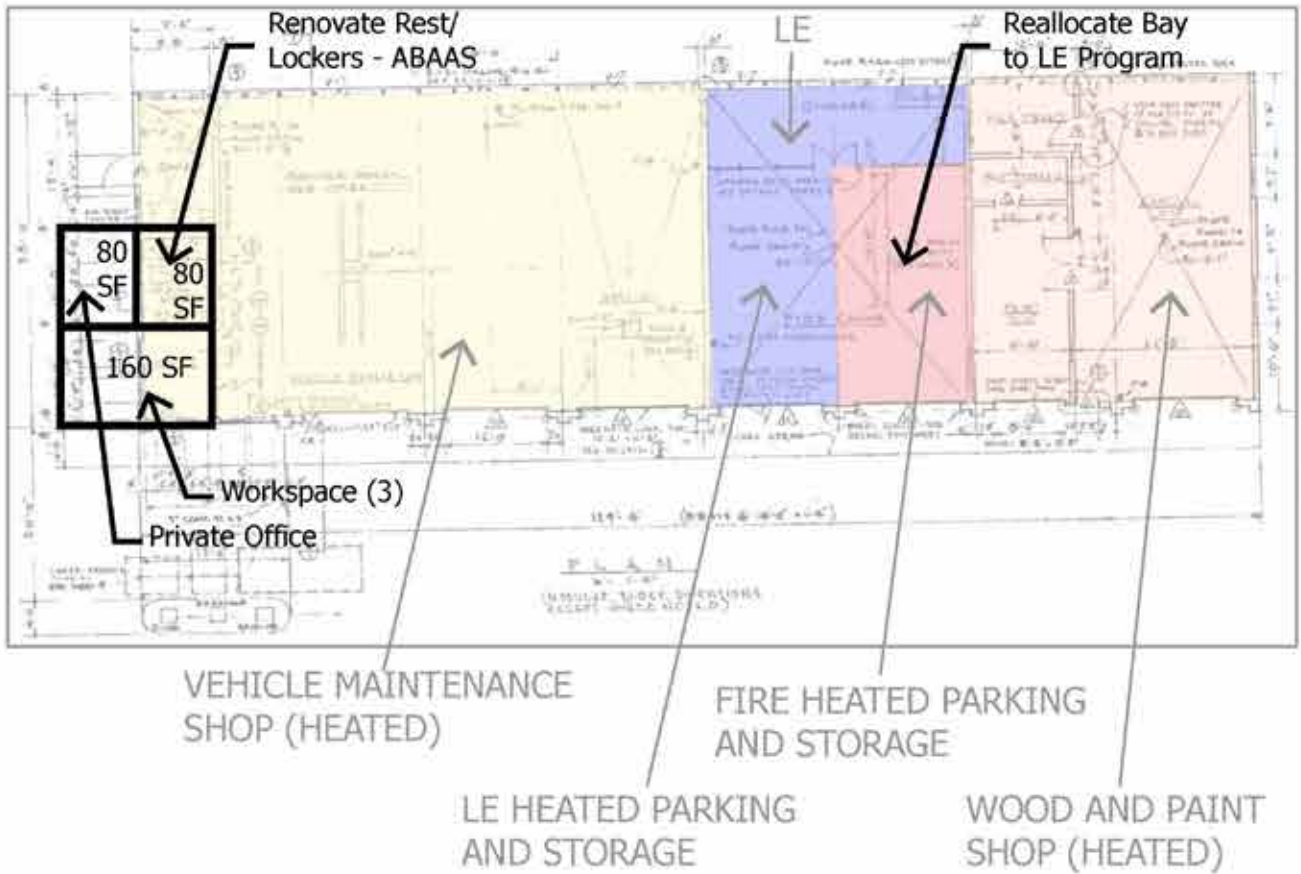
FIGURE D.8 MEDORA AREA UNHEATED STORAGE BUILDING FACILITY DIAGRAM

Facility Revitalization Plan and
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THRO 258662



Legend

- Unheated Vehicle Storage
- Excess Property and Lawn Care
- Vehicle Maintenance Shop
- Fire Heated Parking and Storage
- LE Heated Parking and Storage
- Wood and Paint Shop
- Warehouse/ Shared Storage



- South Unit Maint. Area Needs:
- Galley/Break/Meeting Room
 - Workspaces (3)
 - Heated Bays (2)
 - Larger LE Bay
 - Dedicated Fire Bay
 - Additional Unheated Space
 - Vehicle Maintenance Bay not large enough for snow plow maintenance
 - ABAAS Restroom/Shower/Lockers
 - Moe Publication Storage to VC
 - Task oriented storage with vehicle storage
 - Vehicle Wash Bay



FIGURE D.9 MEDORA AREA RESOURCES BUILDING FACILITY DIAGRAM (CONCEPT A)

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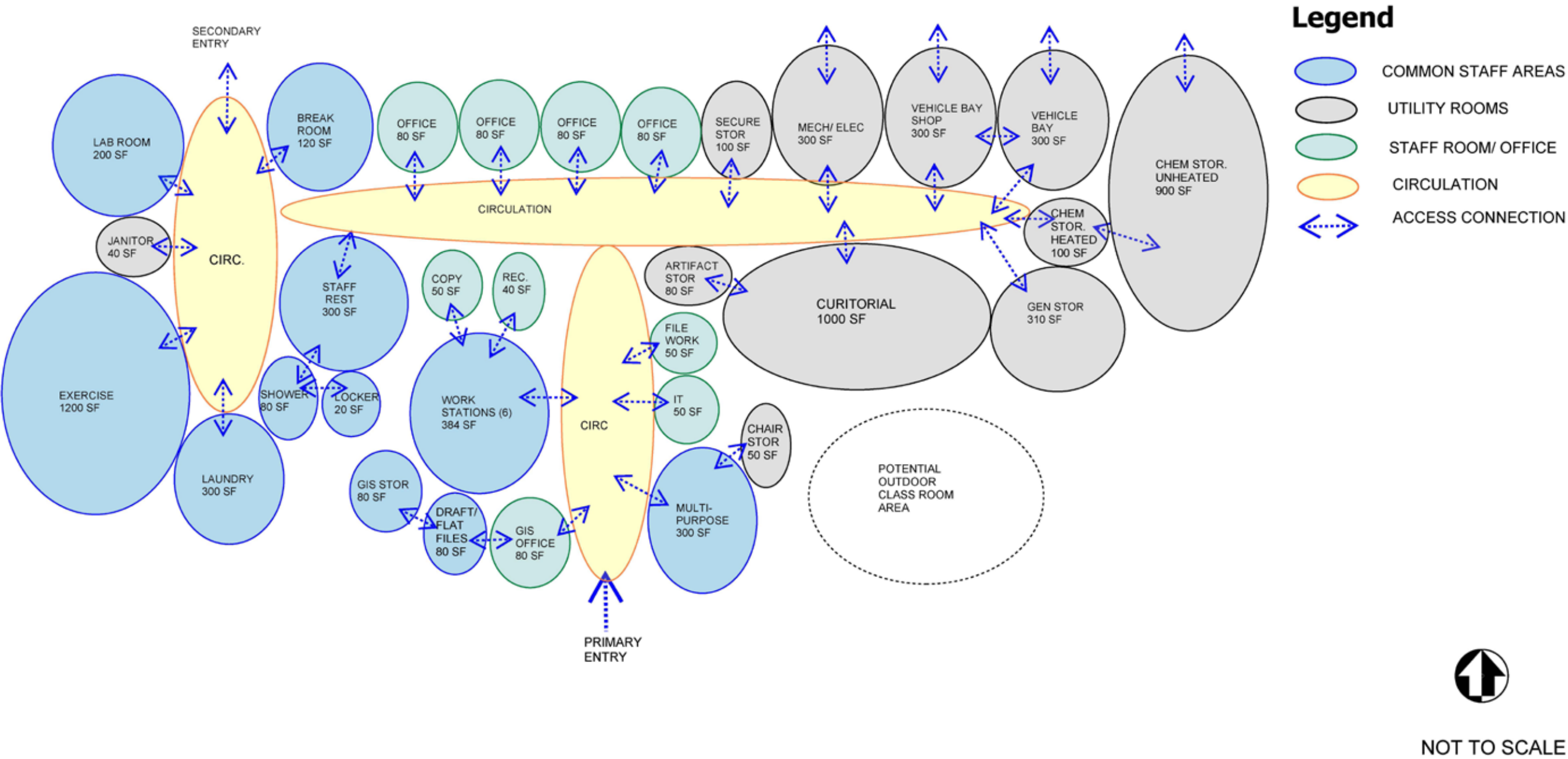
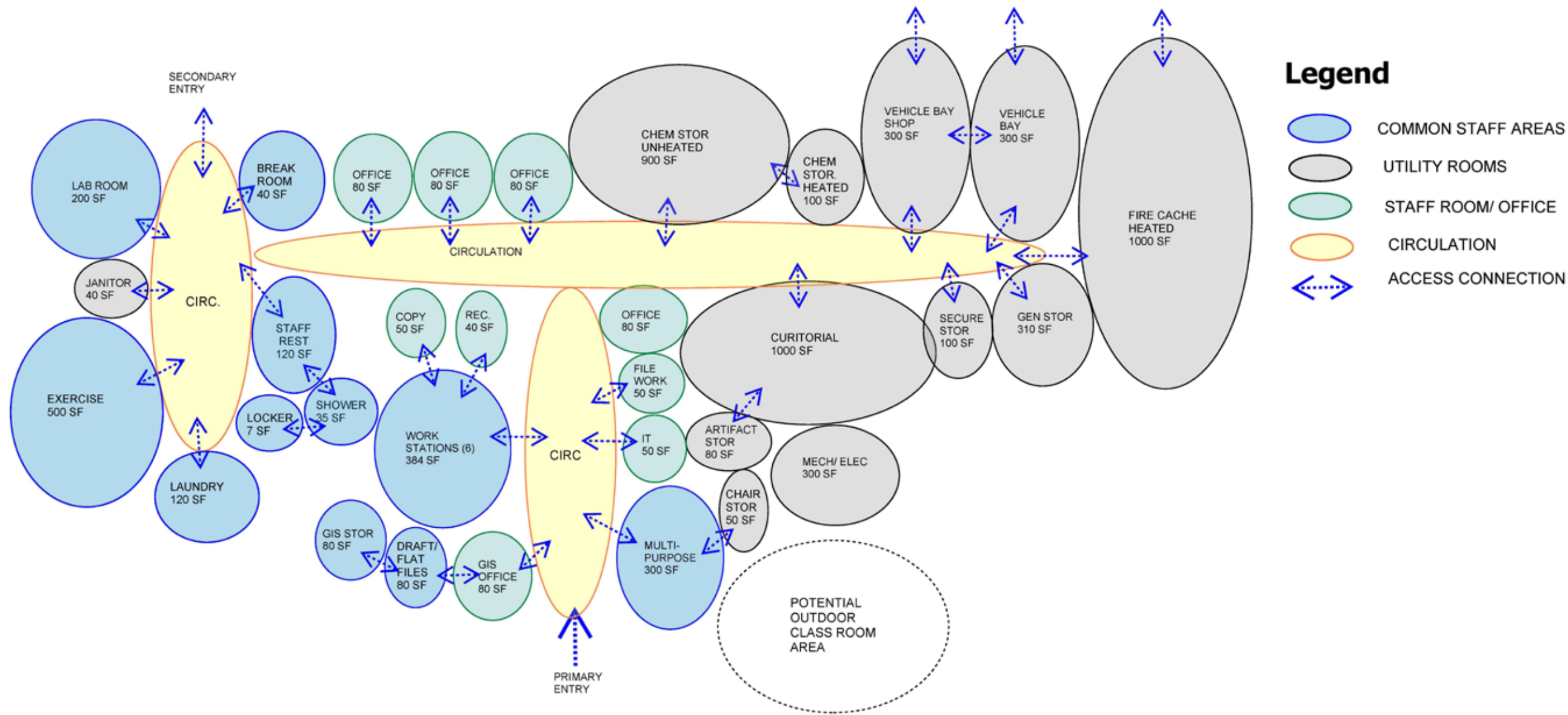


FIGURE D.10 MEDORA AREA RESOURCES BUILDING FACILITY DIAGRAM (CONCEPT B)

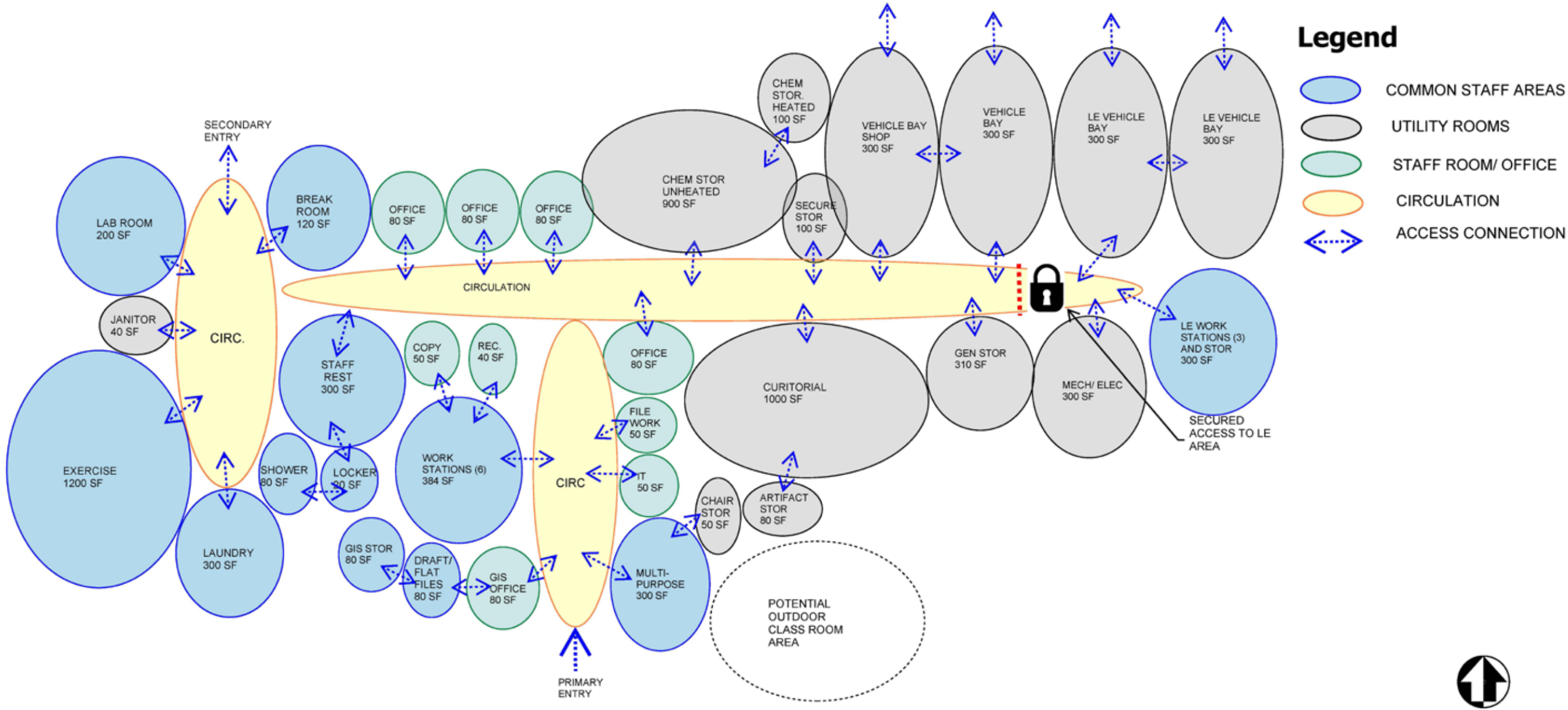
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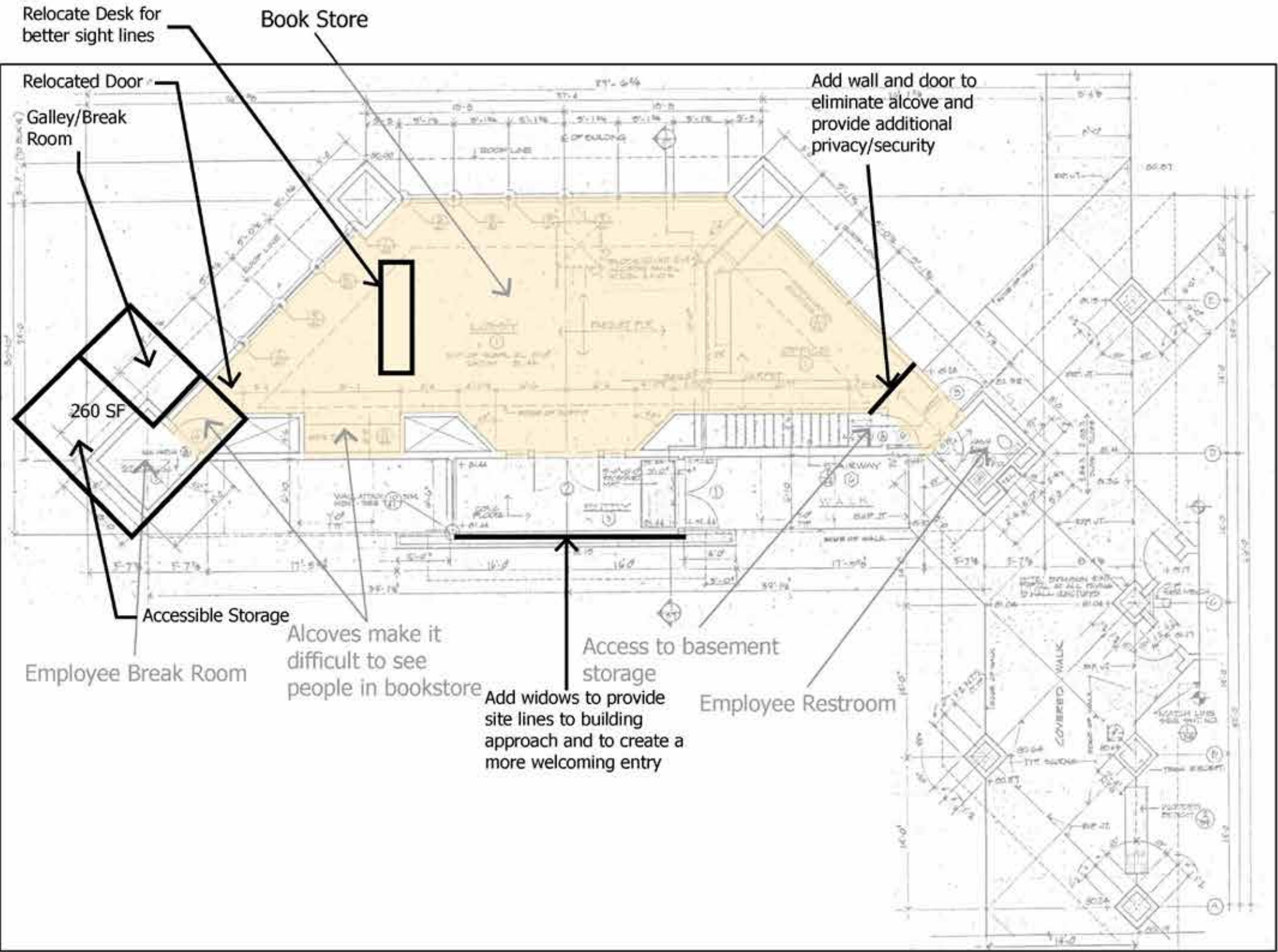
FIGURE D.11 MEDORA AREA RESOURCES BUILDING FACILITY DIAGRAM (CONCEPT C)

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↑
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FIGURE D.12 PAINTED CANYON VISITOR CENTER REMODEL FACILITY DIAGRAM



Facility Revitalization Plan and
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Legend

Book Store

- Painted Canyon Visitor Center Needs:
- Accessible Storage
 - Galley/ Break Room/ Meeting Room
 - Site Lines to Building Approach
 - Minimize Nooks in Bookstore
 - Physical Separation for BOH spaces
 - Multi-Purpose Gateway, Inter-Agency, Library, Medora
 - Arch. Overlook

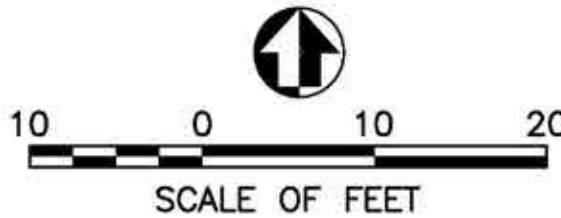


FIGURE D.13 PAINTED CANYON NEW VISITOR CENTER FACILITY DIAGRAM

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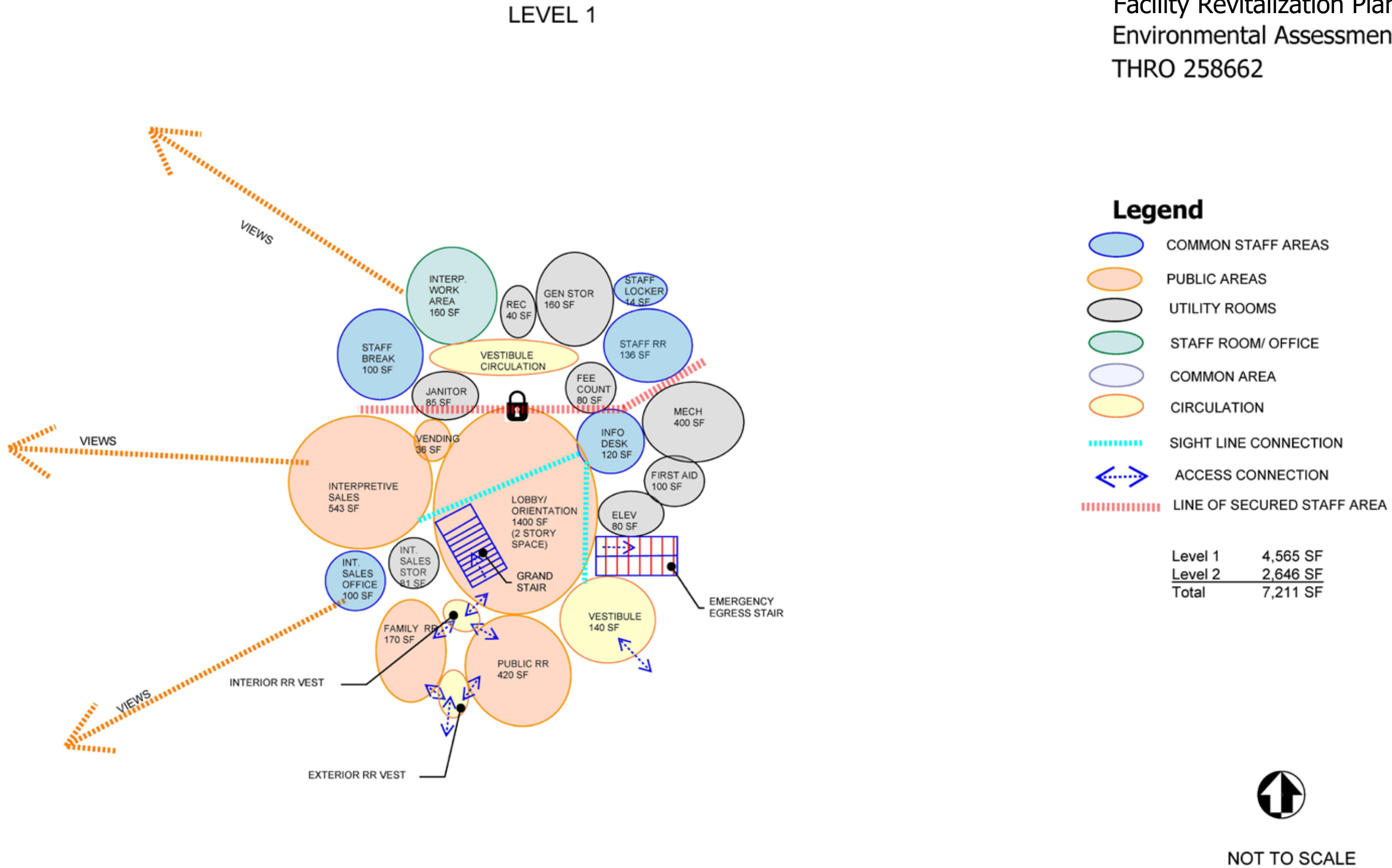


FIGURE D.14 PAINTED CANYON NEW VISITOR CENTER FACILITY DIAGRAM

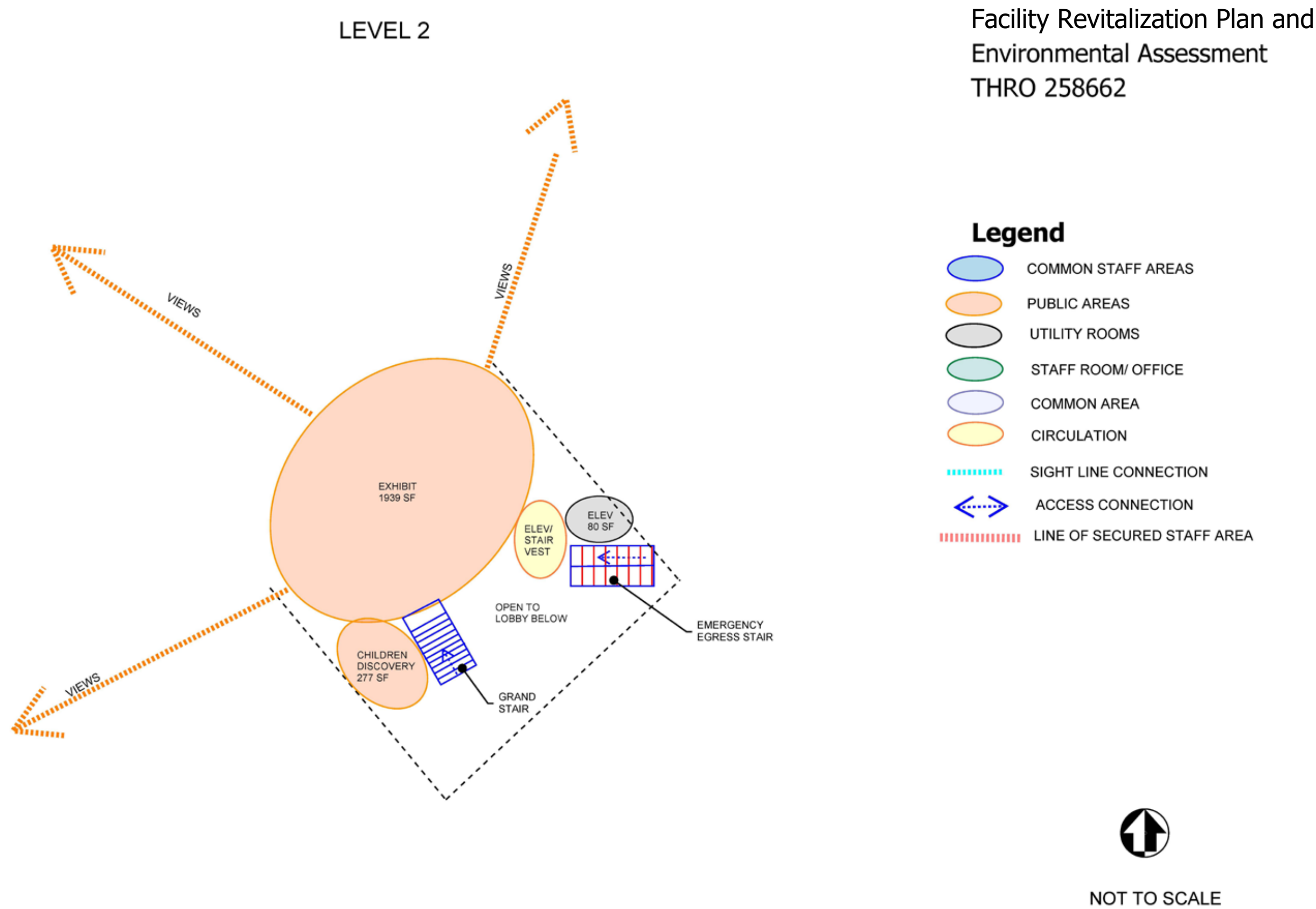


FIGURE D.15 PAINTED CANYON INTERAGENCY FIRE CENTER FACILITY DIAGRAM

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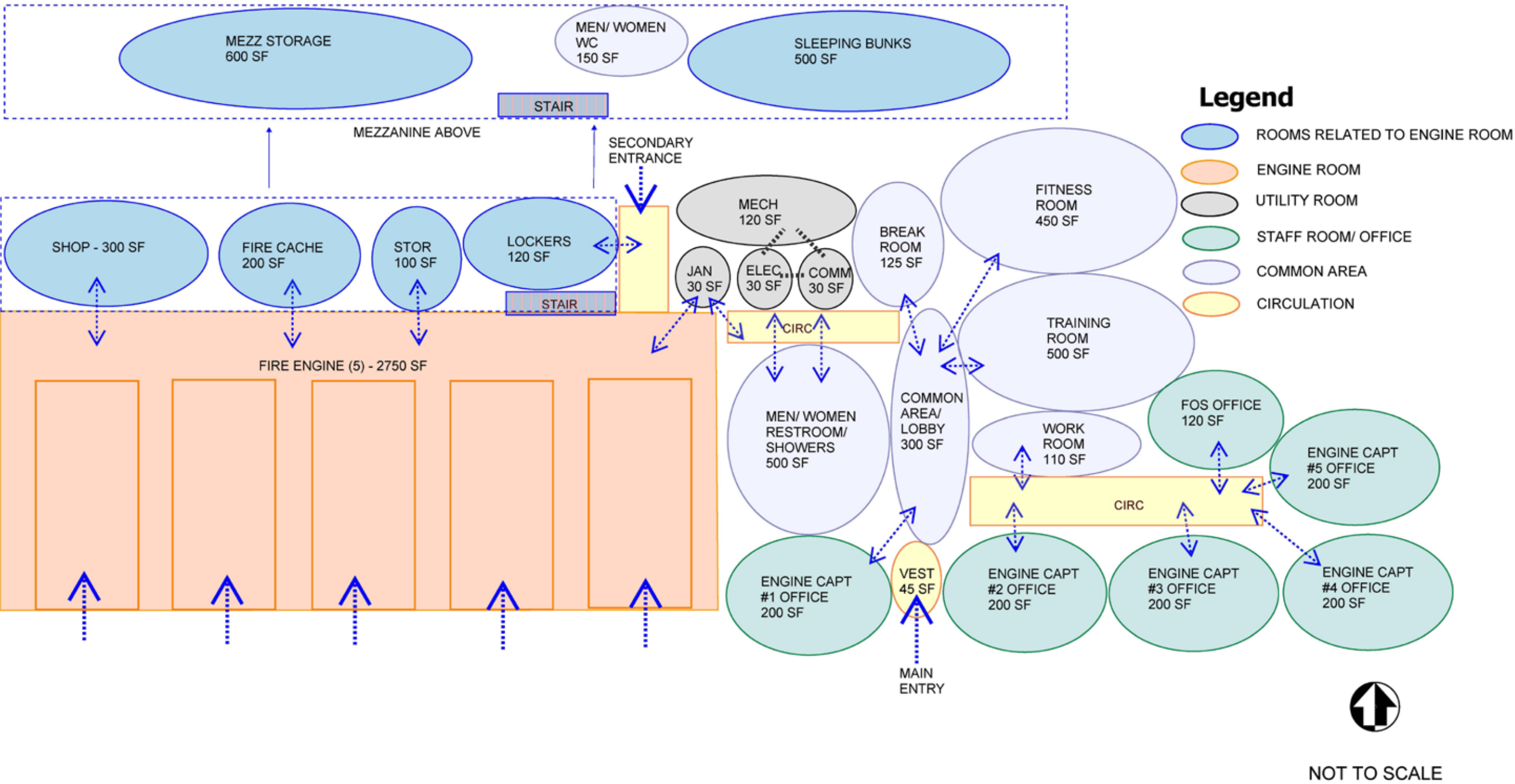
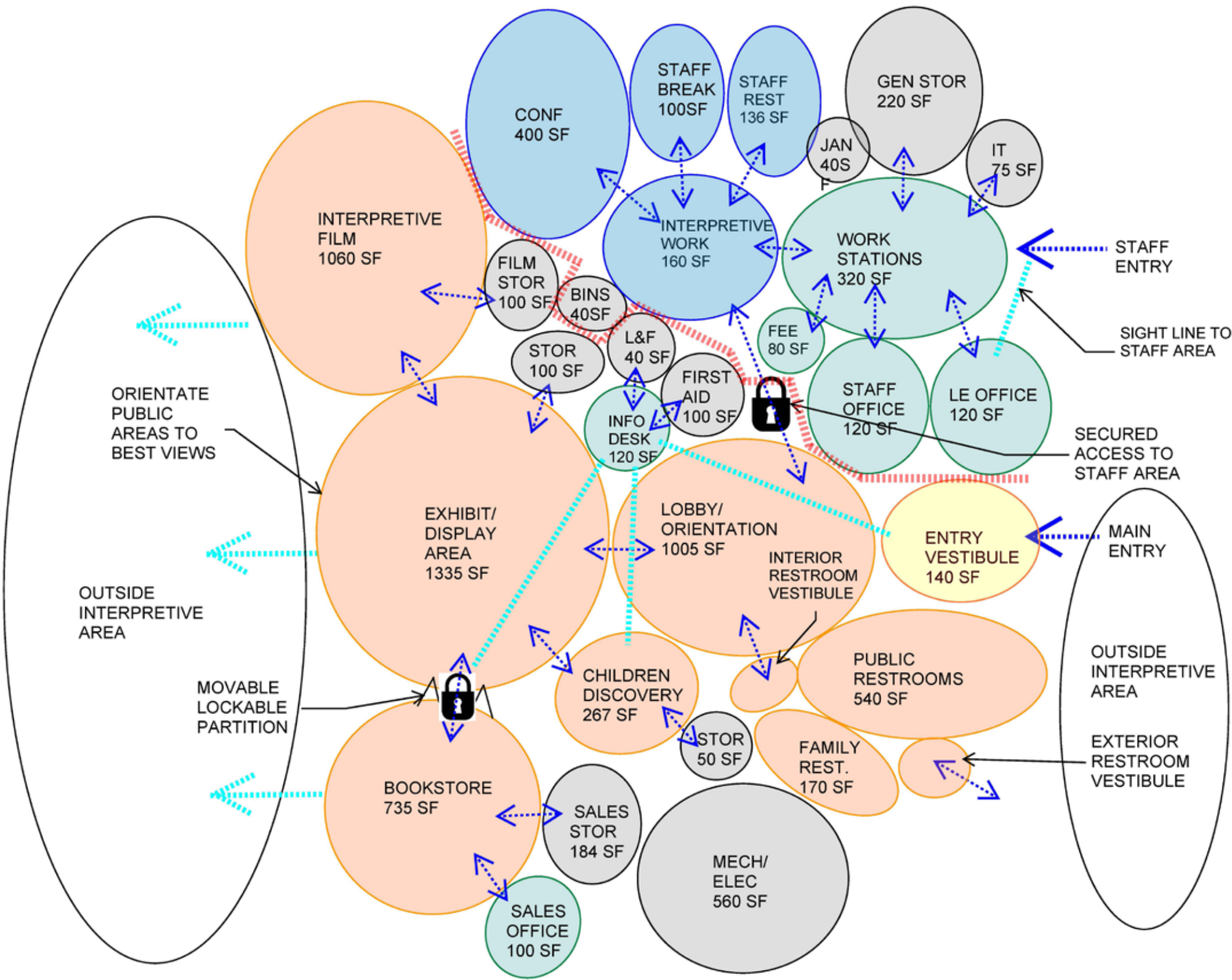


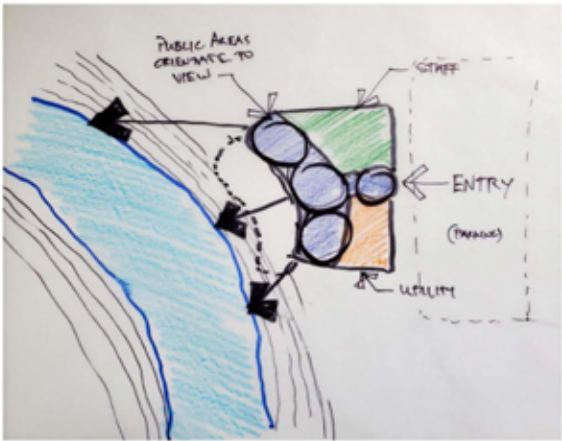
FIGURE D.16 NORTH UNIT VISITOR CENTER FACILITY DIAGRAM



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Legend

- COMMON STAFF AREAS
- PUBLIC AREAS
- UTILITY ROOMS
- STAFF ROOM/ OFFICE
- COMMON AREA
- CIRCULATION
- SIGHT LINE CONNECTION
- ACCESS CONNECTION
- LINE OF SECURED STAFF AREA



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National Park Service
U.S. Department of the Interior