

**BARN BLUFF
NATIONAL REGISTER HISTORIC DISTRICT
GOODHUE COUNTY, MINNESOTA**



CULTURAL LANDSCAPE REPORT

*Site History, Existing Conditions,
Analysis and Evaluation*

Prepared by
Two Pines Resource Group, LLC

January 2015

Cover Image

Red Wing (Detail)
Paul Kramer, 1984

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CULTURAL LANDSCAPE REPORT

*Site History, Existing Conditions,
Analysis and Evaluation*

Prepared for
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Planning Department
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Red Wing, MN 55066

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BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

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BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

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CULTURAL LANDSCAPE REPORT

From the summit of the Grange, the view of the surrounding scenery is surpassed perhaps by very few, if any, of a similar character that the Country and probably the world can afford.

Stephen H. Long
July 18, 1817

~ ~ ~

No one ever comes to Red Wing, who is not seized with a desire to place that bluff beneath his feet. It has done more than anything except the wheat business to make Red Wing famous.

The Grange Advance,
March 4, 1874

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

TABLE OF CONTENTS

LIST OF FIGURES _____	V
LIST OF TABLES _____	VII
CHAPTER 1 . INTRODUCTION _____	1
BOUNDARIES _____	2
BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT _____	3
BARN BLUFF PARK _____	4
STUDY AREA _____	4
PROJECT BACKGROUND _____	4
SCOPE OF PROJECT AND METHODOLOGY _____	7
GUIDELINES _____	7
HISTORICAL RESEARCH _____	7
PREVIOUS CULTURAL RESOURCE STUDIES _____	8
G. A. CARLSON LIME KILN STUDIES _____	9
TRIBAL CONSULTATION _____	9
FIELD VISITS _____	9
CURRENT CONDITION ASSESSMENTS _____	9
GEOGRAPHIC INFORMATION SYSTEM DATA _____	10
REPORT FORMAT _____	10
SITE HISTORY _____	10
EXISTING CONDITIONS _____	10
ANALYSIS AND EVALUATION _____	10
PRESERVATION APPROACH _____	10
SUMMARY OF FINDINGS _____	11
CHARACTERISTICS AND FEATURES OF THE BARN BLUFF HISTORIC DISTRICT _____	11
ADDITIONAL HISTORIC RESOURCES WITH BARN BLUFF PARK _____	12
CHAPTER 2 . HISTORY OF BARN BLUFF _____	13
NATURAL HISTORY _____	13
NATIVE AMERICAN HERITAGE _____	15
THE DAKOTA VILLAGE AT RED WING AND EUROAMERICAN EXPLORATION _____	18
BEGINNINGS OF THE CITY OF RED WING _____	21
RAILROAD DEVELOPMENT _____	24
STONE QUARRYING AND LIME MANUFACTURING INDUSTRIES _____	26
PUBLIC PARK FORMATION _____	31

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

CHAPTER 3 . EXISTING CONDITIONS	41
SITE DEVELOPMENT OVERVIEW	41
SPATIAL ORGANIZATION	42
LAND USE	43
CIRCULATION	43
VEGETATION	45
STRUCTURES	46
NATIVE AMERICAN EARTHWORKS/MOUNDS	46
LIME KILNS	46
CITY WATER DEPARTMENT No. 2 PUMP HOUSE AND RESERVOIR	47
KIOSK/SHELTER	47
WEST OVERLOOK	47
SMALL-SCALE FEATURES	48
FLAGPOLES	48
REMNANT WALLS	48
INTERPRETIVE/INFORMATION SIGNAGE	48
CHAPTER 4 . ANALYSIS AND EVALUATION	53
EVALUATION OF HISTORICAL SIGNIFICANCE	53
CURRENT NATIONAL REGISTER STATUS	53
SUMMARY OF SIGNIFICANCE FOR THE 1817-1939 PERIOD	54
POTENTIAL EXPANSION OF AREAS OF SIGNIFICANCE	54
NATIONAL REGISTER LISTING BOUNDARY DESCRIPTION	55
POTENTIAL REFINEMENT OF THE NATIONAL REGISTER LISTING BOUNDARY	55
EVALUATION OF LANDSCAPE INTEGRITY	56
ANALYSIS OF LANDSCAPE CHARACTERISTICS AND FEATURES	57
TOPOGRAPHY	57
NATURAL SYSTEMS AND FEATURES	58
Geology and Geomorphology	58
East Overlook	59
“Indian Head” and Natural West Overlook	61
VIEWS	62
Mississippi River and Lake Pepin – East Overlook	62
View of Downtown Red Wing and Mississippi River Valley – West Overlook	63
Other Views	63
SPATIAL ORGANIZATION	65
LAND USE	66

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

CIRCULATION	68
Citizen’s Memorial Stairway (West Kiwanis Stairway and West Overlook)	68
East Kiwanis Stairway	71
Central Kiwanis Stairway	73
Prairie Trail	75
Midland Trail	78
North Trail	80
South Trail	82
South Trail - Prairie Trail Connector	83
Carlson Lime Kiln Trail	84
East Overlook – East 3rd Street Trail	85
Road Traces	86
VEGETATION	87
STRUCTURES	90
G. A. Carlson Lime Kiln (GD-RWC-20)	90
G. A. Carlson Tunnel Kiln	91
Limestone Quarries	92
City Water Department Pump House No. 2 (GD-RWC-1378)	93
Kiosk/Shelter and Benches	94
West Overlook (2014)	95
SMALL-SCALE FEATURES	96
Flagpole Base (1929)	96
Flagpole (2011)	97
Limestone Walls (Kiln/Quarry Related)	98
Limestone Walls, Cistern and Features of East 3rd Street Neighborhood	99
National Geodetic Survey Marker	100
Interpretive Markers, Information Signs, and Wayfinding Aids	101
Utility Corridors	104
ARCHAEOLOGICAL RESOURCES	105
Earthworks/Burial Mounds (21GD15)	105
G. A. Carlson Red Wing Pioneer Lime Works Archaeology Site (21GD297)	107
Site Lead (21GDq)	108
Potential Archaeological Resources	109
CHAPTER 5 . PRESERVATION APPROACH	121
PRESERVATION TREATMENT STRATEGIES	121
PRESERVATION	121

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

REHABILITATION _____	122
RESTORATION _____	122
RECONSTRUCTION _____	122
PRESERVATION TREATMENT STRATEGY CONSIDERATIONS _____	123
BARN BLUFF PRESERVATION TREATMENT APPROACH _____	124
PRESERVATION PRIORITIES AND RECOMMENDATIONS _____	125
EROSION AND OFF-TRAIL HIKING _____	125
CONDITION OF BARN BLUFF MOUND GROUP _____	126
SOUTH TRAIL – PRAIRIE TRAIL CONNECTOR EROSION _____	126
DETERIORATION OF CITIZEN’S MEMORIAL STAIRWAY STEPS _____	126
NATIONAL REGISTER FORM UPDATE _____	126
INTERPRETATION PLAN _____	126
ARCHAEOLOGICAL RESOURCES _____	126
PERMITTING OF CITIZEN ORGANIZATION ACTIVITIES _____	127
VISITOR AMENITIES _____	127
AVOIDANCE OF INCOMPATIBLE MATERIALS _____	127
AGENCY CONSULTATION _____	127
BIBLIOGRAPHY OF PRESERVATION GUIDELINES _____	129
REFERENCES CITED _____	131

APPENDIX A: NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION FORM

APPENDIX B: G. A. CARLSON LIME KILN ARCHAEOLOGICAL REPORT

APPENDIX C: UTM COORDINATES OF IDENTIFIED FEATURES

APPENDIX D: HABITAT MANAGEMENT PLAN

LIST OF FIGURES

Figure 1.	Main Street and Mt. La Grange, Red Wing.....	1
Figure 2.	Study Area Locator Map	2
Figure 3.	Barn Bluff Study Area on Topographic Map	3
Figure 4.	National Register District, City Park, and Study Area Boundaries	5
Figure 5.	Barn Bluff Park	6
Figure 6.	G. A. Carlson Lime Kiln.....	9
Figure 7.	Barn Bluff from Across the Mississippi River, 1875	13
Figure 8.	Generalized Cross-Section of Barn Bluff, View to the South (Ojakangas 2009).....	14
Figure 9.	Study Area Outlined on the Barn Bluff Portion of the Goodhue County Soil Survey. 15	
Figure 10.	Native American Earthworks in the Red Wing Area Mapped by Brower and Sweney, 1903	16
Figure 11.	Seth Eastman Painting of a Dakota Village on the Mississippi River near Fort Snelling, c. 1847.....	17
Figure 12.	Barn Bluff (Left) and Red Wing's Village by Seth Eastman, c. 1847	21
Figure 13.	Red Wing and Barn Bluff (Circled) on the General Land Office Survey Map, 1856..	22
Figure 14.	Barn Bluff and Red Wing, c. 1865.....	23
Figure 15.	Barn Bluff on a Plat of Red Wing, 1874	24
Figure 16.	Barn Bluff Before and After Railroad Construction	25
Figure 17.	Plat of Barn Bluff Showing Kiln Locations (Circled), 1894	26
Figure 18.	Crew of Utility Workers below the Linne Lime Kilns on Barn Bluff, 1893	27
Figure 19.	Twin City Lime and Cement Company's Kilns at the Foot of Barn Bluff's North Face	27
Figure 20.	G. A. Carlson's 1882 Kiln and Lime Works.....	29
Figure 21.	Quarries on the East End of Barn Bluff, c. 1895, View to Northwest.....	30
Figure 22.	Barn Bluff Climbers, 1900	32
Figure 23.	The West Face of Barn Bluff Before and After the Construction of Webster's Way (Top c. 1870, Bottom 1891)	33
Figure 24.	Working on Webster's Way.....	34
Figure 25.	The Citizen's Memorial Stairway.....	34
Figure 26.	"Stairway to Mount La Grange"	35
Figure 27.	Barn Bluff's "Indian Head" Rock Formation	35
Figure 28.	Aerial View of Barn Bluff After Blasting for New Bridge, 1960.....	36
Figure 29.	Overlay of 1952 and 1974 USGS Topographic Maps Showing New Highway Alignments on West and South Sides of Barn Bluff.....	36
Figure 30.	Citizen's Memorial Stairway.....	41
Figure 31.	Barn Bluff on 1974 USGS Topographic Map	42
Figure 32.	Hiking Barn Bluff	43
Figure 33.	Prairie Trail segment.....	44
Figure 34.	Vegetation Communities Present on Barn Bluff	45
Figure 35.	Native American Mound atop Barn Bluff.....	46
Figure 36.	G.A. Carlson's 1882 Kiln	46
Figure 37.	Pump House and Reservoir.....	47
Figure 38.	Kiosk/Shelter	47
Figure 39.	West Overlook.....	47
Figure 40.	City Park Sign	48
Figure 41.	Barn Bluff - Existing Conditions Plan	49
Figure 42.	Barn Bluff - Existing Circulation Plan	51
Figure 43.	Existing and Proposed National Register Listing Boundaries	55
Figure 44.	Overview of Barn Bluff and Red Wing, 1875	58
Figure 45.	View from the East Overlook, c. 1880.....	59
Figure 46.	View towards Lake Pepin from the East Overlook, 2014.....	60

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

Figure 47.	Condition of East Overlook, View to the West.....	60
Figure 48.	Barn Bluff's "Indian Head" Rock Formation	61
Figure 49.	View to the Northwest from the Former Natural West Overlook.....	61
Figure 50.	View Towards Lake Pepin from the East Overlook (Top c. 1870, Bottom 2014)	62
Figure 51.	View of Downtown Red Wing and the Mississippi River From Barn Bluff (Top c. 1870, Bottom 2011).....	64
Figure 52.	Aerial View of Barn Bluff, 1960, View to East.....	67
Figure 53.	Citizen's Memorial Stairway.....	68
Figure 54.	Lowest Intact Flight of the 1929 Stairway	69
Figure 55.	Remaining Landing of the 1929 Citizen's Memorial Stairway	69
Figure 56.	Truncated Bottom Flight of the 1929 Stairway.....	69
Figure 57.	Detail of 1929 Stairway Steps with Names of Donors	70
Figure 58.	Uppermost Landing / West Overlook of the 1929 Citizen's Memorial Stairway Prior to Summer of 2014 Construction Work, View to Northwest.....	70
Figure 59.	East Kiwanis Stairway and Park Entrance.....	71
Figure 60.	First Flight of the East Kiwanis Stairway.....	71
Figure 61.	East Kiwanis Stairway Plaza with Kiosk, Benches, and Interpretive Markers	72
Figure 62.	Detail of Steps from the 1929 Stairway Incorporated into the 1976 East Kiwanis Stairway (Note Deterioration).....	72
Figure 63.	Central Kiwanis Stairway and Plaza with Interpretive Marker	73
Figure 64.	Detail of the Steps of the 1982 Stairway.....	73
Figure 65.	Boulder Marker at Foot of the Central Stairway (Note Missing 1929 Plaque at Right)	73
Figure 66.	Bench Created from Steps Salvaged from the 1929 Stairway	74
Figure 67.	Benches Around the Upper Landing of the Central Stairway	74
Figure 68.	Spalling and Deterioration Evident on Salvaged Steps from the 1929 Stairway	74
Figure 69.	Trail Across Top of Barn Bluff, Views to East, 1900	76
Figure 70.	Prairie Trail, View to East.....	77
Figure 71.	Prairie Trail from Near East Overlook, View to West.....	77
Figure 72.	Undated Photograph by Henry Hamilton Bennett of a Trail on the Southeast Side of Barn Bluff	78
Figure 73.	View of Red Wing From Barn Bluff Showing Midland Trail(Arrow), 1900.....	78
Figure 74.	Midland Trail, View to East	79
Figure 75.	Original North Trail Connection to the 1929 Kiwanis Stairway	80
Figure 76.	Connection of the North Trail with the 1929 Kiwanis Stairway, View to Northeast ...	81
Figure 77.	North Trail, View to West	81
Figure 78.	South Trail along Utility Corridor	82
Figure 79.	East 3 rd St. Portion of South Trail, View to East	82
Figure 80.	Inclined Segment of South Trail to East of the Central Kiwanis Stairway, View to West.....	82
Figure 81.	South Trail above the Linne Quarry, View to West.....	83
Figure 82.	Connecting Path Between the South Trail and the Prairie Trail, View to Northeast..	83
Figure 83.	Spur Track Illustrated on 1894 Plat Map	84
Figure 84.	G. A. Carlson Lime Kiln Trail, View to Southeast	85
Figure 85.	Switchback Roads near the G. A. Carlson Lime Kiln are Visible at Left in this c. 1885 Photograph of the Lime Works, View to West	86
Figure 86.	Edwin Whitefield's c.1856 Painting Illustrates Barn Bluff's Wooded North Face, Expansive Prairie, and Exposed Bedrock.....	87
Figure 87.	Aerial Photograph from 1953 Illustrating Wooded North Slope and Extent of Prairie on Barn Bluff's South Slope	88
Figure 88.	Wooded North Slope of Barn Bluff from the Mississippi River, 1900	88
Figure 89.	Prairie with Oak Groves in the Background on the Bluff's Southern Exposure	89
Figure 90.	Wild Ginger on North Slope	89
Figure 91.	G. A. Carlson's 1882 Kiln, c. 1885	90
Figure 92.	G. A. Carlson's 1882 Lime Kiln	90

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

Figure 93. Tunnel Kiln Entrance, View to Northwest	91
Figure 94. F. J. Linne Quarry	92
Figure 95. North Quarry of the Twin City Lime and Cement Company	92
Figure 96. Pump House No. 2.....	93
Figure 97. Reservoir and Pump House.....	93
Figure 98. Kiosk/Shelter, View to South.....	94
Figure 99. Bench on East Stairway Plaza.....	94
Figure 100. West Overlook Completed in 2014, View to Northwest.....	95
Figure 101. American Legion 1929 Flagpole Base, View to the North	96
Figure 102. 1929 Flagpole Base, View to Southwest.....	96
Figure 103. American Legion Flagpole Erected in 2011.....	97
Figure 104. Quarry Road Retaining Wall Along the North Trail, View to West.....	98
Figure 105. Terraces with Retaining Walls at the Back of a Former East 3rd Street Lot	99
Figure 106. Hillside Cistern	99
Figure 107. Geodetic Survey Marker and 1929 Flagpole Base, View to Northeast	100
Figure 108. Geodetic Survey Marker	100
Figure 109. The “Webster’s Way” Sign (Arrow) is Visible in this c. 1900 Photograph.....	101
Figure 110. Citizen’s Memorial Stairway Plaques and Hillside Sign, c. 1929.....	101
Figure 111. Wing & Olson Clothiers Billboard atop Barn Bluff, 1897.....	102
Figure 112. Interpretive Markers and Signs	103
Figure 113. Photograph from c. 1895 Showing Utility Pole (Circled) on Southeast Portion of Barn Bluff.....	104
Figure 114. Eroded Trail on Mound 1	106
Figure 115. Erosion and 1929 Flagpole Base and Geodetic Survey Marker atop Mound 1	106
Figure 116. Recent Trail Cut near Mound 1.....	106
Figure 117. G. A. Carlson’s Red Wing Pioneer Lime Works on Barn Bluff	108
Figure 118. Linne Lime Kilns, 1893.....	109
Figure 119. Ruins of Linne Lime Works on Bluff Edge	110
Figure 120. Road Trace Between Linne Kiln and Quarry	110
Figure 121. Twin City Lime and Cement Company’s Kilns at the Foot of Barn Bluff’s North Face	111
Figure 122. Machinery Mounts in Twin City Lime and Cement Quarry	111
Figure 123. Detail of East 3rd Street Neighborhood on 1957 Right of Way Map	112
Figure 124. Barn Bluff – 1938 Period Plan.....	117
Figure 125. Barn Bluff – Identified and Potential Archaeological Resources	119

LIST OF TABLES

Table 1. Summary Table of Landscape Feature Evaluations	113
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BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

CHAPTER 1 . INTRODUCTION

Rising dramatically above the town, Barn Bluff, also known as Mount La Grange, is the city of Red Wing's most iconic landmark. Formed of limestone bedrock that over a half billion years ago was the floor of a shallow inland sea, this section of land was separated from the mainland when torrents of glacial meltwater carved it into an island within the wide valley of the ancestral Mississippi River. Over time, the bluff developed an almost mesa-like appearance having a nearly-level top supported on vertical exposures of limestone that rose above a skirt of steep side-slopes formed of eroded material. The resulting distinct landform has borne silent witness to thousands of years of human history unfolding at the point in the river valley that would become Red Wing. For Native Americans and EuroAmericans alike, it has served as a significant landmark. To the Dakota, the area was known as *He Mni Can* (hill, water, wood) and the French called the bluff *La Grange*, a name that in translation became Barn Bluff.¹ With its accessible bluff top offering panoramic views both up and down the river, Barn Bluff is featured repeatedly in accounts of the early exploration of the Upper Mississippi. As the City of Red Wing grew from a Mdewakanton Dakota village and early EuroAmerican outpost into a booming commercial center at the heart of the wheat market, Barn Bluff became increasingly a recreational draw for community members and visitors to Red Wing despite being a hub of intensive stone quarrying activity. In 1908, quarrying and lime production on the bluff ceased and the property was deeded to the city in 1910 to form a public park. Since then, the citizens of Red Wing, through the efforts of philanthropic and service organizations, have improved the trail network in order to facilitate access to the top of the bluff. Despite the loss of portions of the landform to the aforementioned quarrying, as well as railroad and highway development, Barn Bluff's character as Red Wing's most recognizable landmark is undiminished, and, just as it has for thousands of years; it continues to invite those that see it to scale its heights.



FIGURE 1. MAIN STREET AND MT. LA GRANGE, RED WING

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

The historical and cultural significance of Barn Bluff as a geographic landmark was recognized in 1990 with its listing in National Register of Historic Places (Appendix A). The historic district encompasses approximately 50 acres of city and state (MnDOT) land and is largely located within the city's 43-acre Barn Bluff Park. The historic district and park encompass the landform of Barn Bluff/La Grange as well as archaeological sites that bear testimony to its use by Native Americans, features associated with its development as a recreational property, and reminders of its significant role in Red Wing's lime manufacturing industry.

A Cultural Landscape Report is a long-term management tool designed to guide future decisions regarding the preservation and use of a historic cultural landscape. The report documents the history and current conditions of the property, identifies its principal characteristics and features, and establishes preservation goals. This Cultural Landscape Report has been prepared to ensure that the City's management of Barn Bluff Park will continue to preserve and protect the features and characteristics that make this one of the Minnesota's significant historical places.

BOUNDARIES

Barn Bluff is located within the City of Red Wing in Goodhue County, Minnesota (Figure 2). The landform is situated in the NW ¼ and the NE ¼ of Section 29 and the NE ¼ of Section 30 of Township 113N, Range 14W (Figure 3). Barn Bluff bounds the downtown to the northeast and is visible throughout much of the city's historic core. U.S. Routes 61 and 63 and Minnesota Highway 58 intersect to the southwest of the bluff. The Mississippi River flows past the north side of the landform. An active rail line runs between the river and the foot of the bluff.



**FIGURE 2. STUDY AREA
LOCATOR MAP**

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

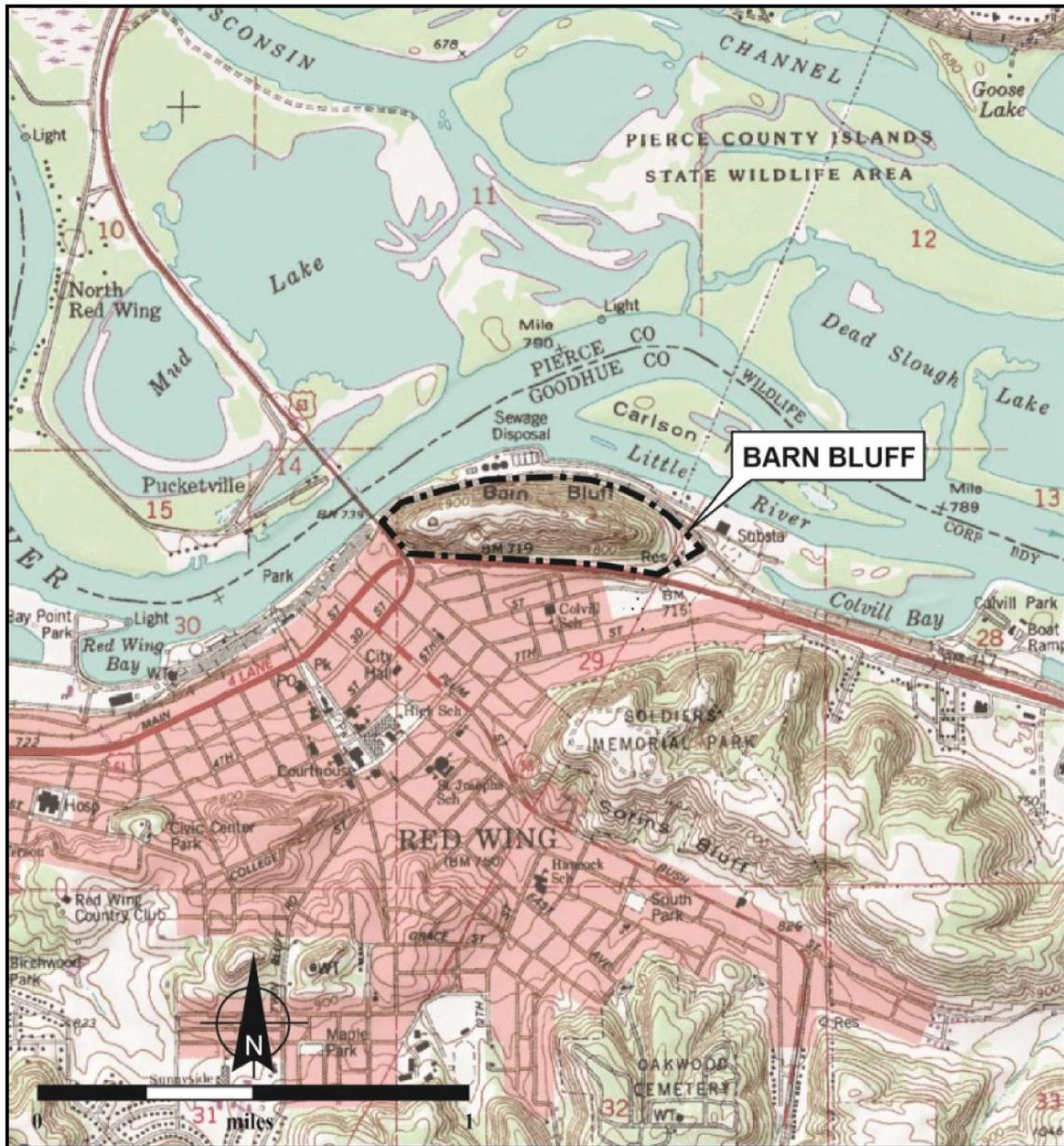


FIGURE 3. BARN BLUFF STUDY AREA ON TOPOGRAPHIC MAP
(USGS, RED WING, 1994)

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT

The boundary of the Barn Bluff National Register Historic District is defined as the 740-foot contour line on the United State Geological Survey's 7.5-minute quadrangle map (Red Wing, Minn.-Wis., 1974). The district is comprised of one site (the landform) and one contributing structure (a concrete staircase).² The boundary encompasses an approximately 50 acre area that is largely contained within the boundary of the City of Red Wing's Barn Bluff Park, but which is also partially within Minnesota Department of Transportation right of way (Figure 4).

BARN BLUFF PARK

The City of Red Wing's Barn Bluff Park is a 43-acre area bound on the west by the U.S. Route 63 corridor, on the south by the right of way of U. S. Route 61/63, on the east by East 5th Street, and on the north by Canadian Pacific (CP) Railway right of way (see Figure 4). The boundary of the park encompasses the majority of the landform. The park entrance is located on East 5th Street.

STUDY AREA

In order to encompass both that portion of Barn Bluff that is located within the boundary of the National Register Historic District as well as the City-owned Barn Bluff Park, the study area of the Cultural Landscape Report is bound on the west by the U.S. Route 63 corridor, on the south by the U. S. Route 61/63 corridor, on the east by East 5th Street, and on the north by the trackage of the Canadian Pacific (CP) Railway (see Figure 4).

It should be noted that due to the removal of portions of the bluff by highway and railroad construction, the historical extent of Barn Bluff extends beyond the study area and that the historical context of the study encompasses the bluff in its entirety.

PROJECT BACKGROUND

The City of Red Wing's Barn Bluff Park encompasses the National Register-listed G. A. Carlson Lime Kiln and the Barn Bluff Historic District. In 2014, the City of Red Wing received a grant from the Minnesota Arts and Cultural Heritage Fund ("Legacy Grant") to complete a Historic Structure Report (HSR) of the kiln and a Cultural Landscape Report for the bluff. The purpose of the HSR is to document the kiln structure and provide guidelines for stabilization and potential restoration efforts with the goal of ensuring the preservation of the kiln for the future. The Cultural Landscape Report will aid in future planning for Barn Bluff Park by providing an inventory and analysis of the bluff's characteristic features together with recommendations for their future treatment.

The principal visitor amenity of Barn Bluff Park is a trail network that traverses the bluff's open prairies, abandoned quarries, and forested hillsides (Figure 5). While Barn Bluff is a city park, visitors from throughout the region come to Red Wing to hike the bluff. During a stroll up the bluff, a visitor may encounter casual tourists, daily walkers, rock climbers, nature enthusiasts, photographers, and students of geology. As the City considers future trail improvements, vegetation management, and ecosystem restoration, the Cultural Landscape Report will provide the information necessary to create in Barn Bluff Park a place that simultaneously preserves, protects, and shares the history of this unique cultural landscape.

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

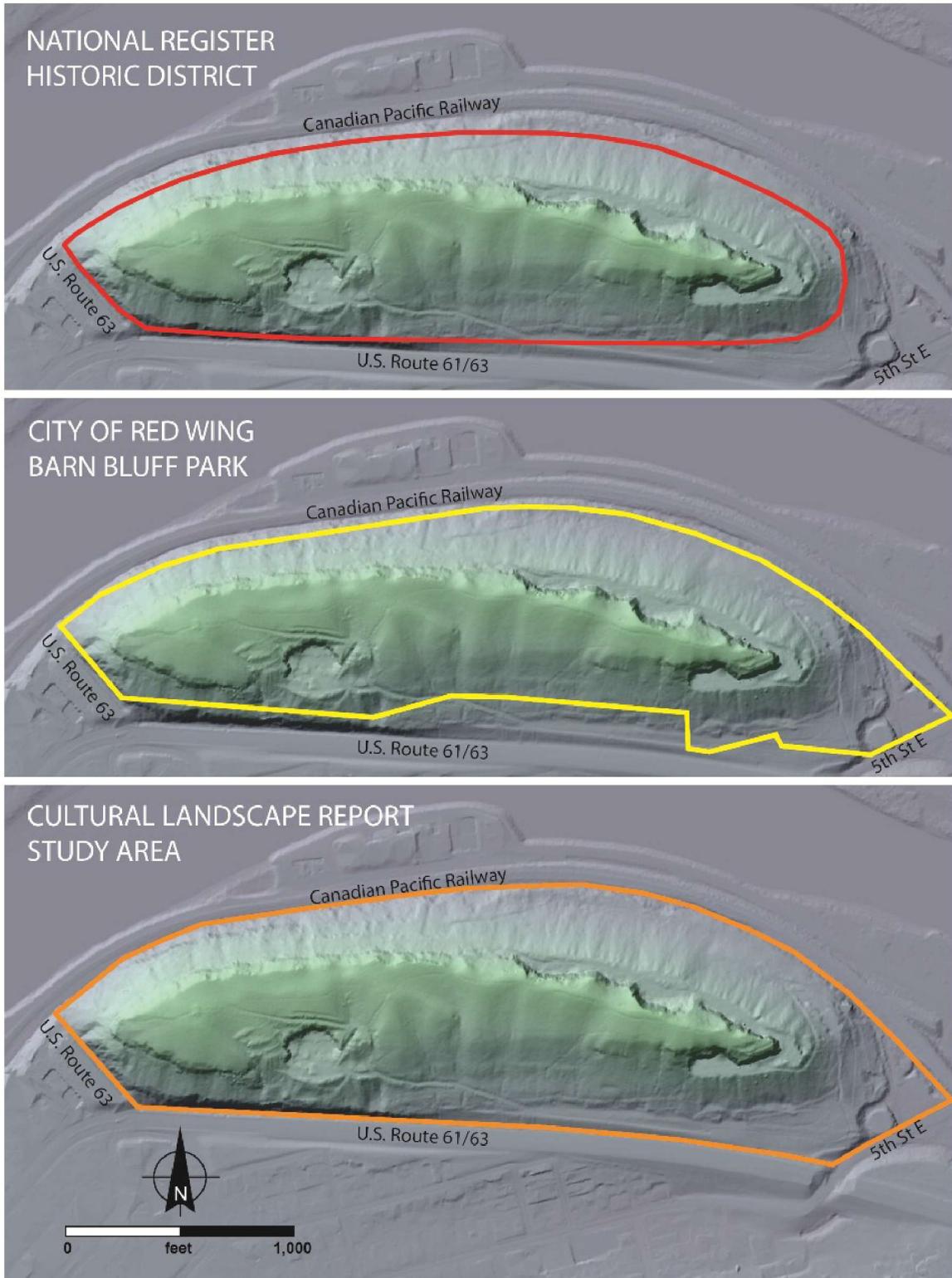


FIGURE 4. NATIONAL REGISTER DISTRICT, CITY PARK, AND STUDY AREA BOUNDARIES
(LIDAR BASE MAP, MINNESOTA GEOSPATIAL INFORMATION OFFICE)

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT



FIGURE 5. BARN BLUFF PARK
(CITY OF RED WING)

SCOPE OF PROJECT AND METHODOLOGY

A Cultural Landscape Report is needed for Barn Bluff to ensure that the long-term management of the park reflects *The Secretary of Interior's Standards for the Treatment of Historic Properties*. The Cultural Landscape Report will also facilitate the Minnesota State Historic Preservation Office's review of future undertakings that may impact the Barn Bluff National Register Historic District. To this end, the Cultural Landscape Report will:

- Identify the characteristic and defining features of Barn Bluff in order to ensure their future preservation
- Increase the understanding of how the landscape of Barn Bluff has been literally shaped by its history
- Include plans and images of Barn Bluff that illustrate its history in order to aid in future planning and the development of interpretation plans
- Provide guidance on the placement of new facilities and circulation features that are sensitive to the site's historic use and character
- Highlight preservation needs and interpretation opportunities

GUIDELINES

Guidelines for the preparation of a Cultural Landscape Report are outlined in *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques* (Page et al. 1998). Standards for the treatment of these resources are provided in the publication *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (Birnbaum and Peters 1996). Additional guidelines for the management and preservation of cultural landscapes are also defined in Preservation Briefs 36, *Protecting Cultural Landscapes: Planning Treatment and Management of Historic Landscapes* (Birnbaum 1994). This project was conducted in accordance with these guidelines and additional applicable federal and state guidelines and standards, including those established by the Advisory Council on Historic Preservation (National Park Service 2002), and those of Minnesota's State Historic Preservation Office (SHPO) (Anfinson 2005; SHPO 2010) and Office of the State Archaeologist (OSA) (Anfinson 2011). The methods and report for the meet the U.S. Secretary of Interior's Standards for Identification and Evaluation (National Park Service 1997).

HISTORICAL RESEARCH

Additional historical research to augment the existing site history and historical context contained within the National Register nomination was conducted in support of the Cultural Landscape Report and to aid in feature identification. Resource types consulted included historic images, maps, aerial photographs, newspapers, and other primary and secondary documentary resources in the holdings of the Minnesota Historical Society; the Goodhue County Historical Society, the Red Wing Public Library, the University of Minnesota's Borchert Map Library, and a variety online databases including, but not limited to, the Library of Congress, the Winona Newspaper Project, and Minnesota Reflections.

PREVIOUS CULTURAL RESOURCE STUDIES

In preparation for this study, the results of previous cultural resource studies that have encompassed portions of Barn Bluff were reviewed. These include:

- An Archaeological Survey of the City of Red Wing, Minnesota (Dobbs 1985)

Barn Bluff and its recorded mound group (21GD15) were encompassed by this study, but no fieldwork occurred on the bluff.

- From Palisade Head to Sugar Loaf: An Inventory of Minnesota's Geographic Features of Historic and Cultural Significance (Zellie 1989a)

This historic context study resulted in the listing of Barn Bluff on the National Register of Historic Places.

- Phase IA Archaeology and Phase I Architectural History Survey for the Red Wing Riverfront Trail Project, Red Wing, Goodhue County, Minnesota (Van Erem et al. 2010)

The visual area of potential effects for this project encompassed the National Register-listed 1882 G. A. Carlson Lime Kiln (GD-RWC-020) and the City Water Department Pump House No. 2 (GD-RWC-1378), which the consultant recommended as potentially eligible for inclusion in the National Register.

- Pre-Evaluation Study for Archaeological Potential for the Trunk Highway 63 Red Wing Bridge Project, Goodhue County, Minnesota, and Pierce County, Wisconsin (Terrell and Vermeer 2012)

The project study area encompassed a portion of the west and south slopes of Barn Bluff. Potential archaeological resources identified included the previously recorded Barn Bluff mound group (21GD15), the remains of the F. J. Linne lime kiln, and former residences located along East 3rd Street. Field assessment was limited to a visual reconnaissance.

- Phase I Archaeological Survey for the Trunk Highway 63 Red Wing Bridge Project, Goodhue County, Minnesota, and Pierce County, Wisconsin (Terrell 2015).

For the Phase I archaeological survey, the Barn Bluff portion of the study area was reduced to only that area immediate to the existing bridge approach, which has been previously disturbed to bedrock.

G. A. CARLSON LIME KILN STUDIES

In conjunction with this study, a Historic Structures Report of the 1882 G. A. Carlson lime kiln was prepared and an archaeological investigation of Carlson's lime manufacturing operations on Barn Bluff was conducted in support of the documentation of the structure. The archaeological study, which also documents modifications to the bluff resulting from the lime works, is appended to this document (Appendix B).



FIGURE 6. G. A. CARLSON LIME KILN

- Historic Structure Report for the G. A. Carlson Lime Kiln (MacDonald & Mack Architects et al. 2014)
- Archaeological Investigation of the G. A. Carlson Red Wing Pioneer Lime Works (21GD0297), City of Red Wing, Goodhue County, Minnesota (Terrell and Terrell 2014)

TRIBAL CONSULTATION

On July 8, 2014, Two Pines contacted the Prairie Island Indian Community's (PIIC) Tribal Historic Preservation Officer (THPO). On July 28, 2014, Michelle Terrell and Eva Terrell of Two Pines met with THPO Michael Bergervoet. The purpose of the meeting was to introduce the study and to discuss any concerns of the tribe. The THPO was unable to provide any additional historical information on Barn Bluff or identify any potential informants. The THPO asked that PIIC be consulted during planning and informed of undertakings within Barn Bluff Park and the City of Red Wing as whole given the cultural significance of the area as exemplified by the number of sites and earthworks present within the city.

FIELD VISITS

Fieldwork consisted of a pedestrian reconnaissance of the entirety of the study area in order to identify and document the landscape elements present and conduct limited archaeological testing. Field visits were conducted in May, June, and July of 2014. All current condition photographs are Two Pines Resource Group unless otherwise cited.

CURRENT CONDITION ASSESSMENTS

During the fieldwork portion of the project, the current condition of each identified feature was recorded through field notes and digital photographs. For each feature the project team completed an evaluation form based on one used by the National Park Service. Items noted included, but were not limited to, information on materials, evidence for deterioration or erosion, and any other information pertinent to the preservation, treatment, and potential interpretation of the resource. This documentation will provide a base line for future assessments.

GEOGRAPHIC INFORMATION SYSTEM DATA

The locations of features within Barn Bluff Park were recorded using a Trimble GeoXT GPS Unit. All the data was differentially corrected using a National Geodetic Survey (NGS) continuously operating reference station (CORS) data. A table of the recorded UTM coordinates of the individual features is provided in Appendix C.

REPORT FORMAT

A Cultural Landscape Report is typically a three-part document that provides the information necessary to make management decisions that preserve the integrity of a historic landscape.³

- Part 1 provides the property's history, describes the existing condition of the landscape, and then, based on the information gathered, concludes with an analysis and evaluation of the historical integrity of the landscape and its characteristic features.
- Part 2 provides the preservation strategy for the long-term management of the cultural landscape based on its significance, existing condition, and use.
- Part 3 documents the implementation of the management plan, or aspects of it. Because this work is often not completed in tandem with Parts 1 and 2, the record(s) of treatment and its supporting documentation are usually provided in an appendix or addendum to the report.

The Cultural Landscape Report for Barn Bluff includes the following sections.

SITE HISTORY

In this section of the report, the history of Barn Bluff is presented from its geological development through the present. The historical narrative is divided into temporal themes that are manifested in the landscape of the bluff. The history of the property not only provides a context for the evaluation of the bluff's features, but also documentation for future interpretation.

EXISTING CONDITIONS

The present appearance of Barn Bluff is described in this section of the report. Included are descriptions of the current spatial organization, land use, circulation patterns, vegetation, and features of the property.

ANALYSIS AND EVALUATION

The features of Barn Bluff are inventoried in this section of the report. In the course of documenting the historical and current conditions of each of the features, those that contribute to the historical significance of Barn Bluff are identified.

PRESERVATION APPROACH

Based on the results of the first sections of the Cultural Landscape Report, this portion of the document provides preservation strategies for the long-term management of Barn Bluff's cultural landscape.

SUMMARY OF FINDINGS

The Barn Bluff landform was listed on the National Register of Historic Places in 1990 as a natural feature of local significance under National Register Criterion A in the areas of Exploration/Settlement and Entertainment/Recreation. The period of significance commences in 1817 with the description of Barn Bluff made by explorer Stephen H. Long and his geologist William Keating. The 1939 end date for the period of significance encompasses the inclusion of the site in the 1938 WPA automobile tour book *Minnesota, a State Guide* and corresponds as well to the 50 year cut-off when the nomination was written in 1989.⁴

As a whole, Barn Bluff retains its integrity as a distinct and recognizable landform. Its integrity of location, setting, materials, feeling, and association remains. The relationship of Barn Bluff to the Mississippi River and the City of Red Wing remains unchanged and the natural forces that led to its creation at this point in the river can still be visualized. Vegetation patterns, trails, and features from the bluff's period of significance are retained. Its association with events that have made a significant contribution to the broad patterns of our history including exploration of the Upper Mississippi during the 19th century and for its association with mid-19th through early 20th-century travel, tourism, and recreation remains. While portions of the bluff have been removed, as noted in the National Register nomination, "The integrity of the feature, however, is not greatly diminished by these cuts or by the highway bridge at Barn Bluff's northern tip."⁵ Recent additions to the park, including the 2011 flagpole and 2014 West Overlook, do not detract significantly from the overall integrity of the landform.

CHARACTERISTICS AND FEATURES OF THE BARN BLUFF HISTORIC DISTRICT

The cultural landscape study identified the following characteristics and features of Barn Bluff, which were present during its period of significance, as contributing to its historic significance as a geographic feature of historic and cultural landscape. The active preservation of these characteristics and features is inherent to the continued protection of Barn Bluff's historical significance.

- Bluff Topography and East Overlook
- Land Use (Tourism/Recreation and Natural Resources)
- Circulation (Prairie Trail, Midland Trail, North Trail, 3rd St. E – East Overlook Trail)
- East View of the Mississippi River and Lake Pepin
- West View of Downtown Red Wing and Mississippi River
- Vegetation (Prairie, Oak Savanna, Deciduous Forests)
- Kiwanis Stairways
- 1929 Flagpole Base

ADDITIONAL HISTORIC RESOURCES WITH BARN BLUFF PARK

The City of Red Wing's Barn Bluff Park also contains the following historic properties, which, while they do not contribute directly to the historical significance of the Barn Bluff Historic District or are outside the boundary of the district, as presently defined, they are, or potentially are, historically significant in their own right. These features are protected under federal and/or state statutes and impacts to them should likewise be avoided.

In the case of unidentified archaeological sites, archaeological resources are to be protected and preserved in place. Subsurface impacts should be avoided in areas of archaeological sensitivity. If ground-disturbing activities are necessary in these areas, archaeological investigations will take place prior to the undertaking. If archaeological resources are identified, and disturbance cannot be avoided, mitigation measures will be undertaken.

- Native American Earthworks/Burial Mounds (21GD15)
- G. A. Carlson Lime Kiln (National Register-listed) (GD-RWC-20)
- G. A. Carlson's Pioneer Lime Works – Archaeological Site (21GD297)
- City Water Department Pump House No. 2 and Reservoir (GD-RWC-1378)
- Potential Archaeological Resources
 - Native American Heritage Sites
 - Features related to the operation of the F. J. Linne and Twin City Lime & Cement companies (kilns, foundations, quarries, roads, machinery bases)

It is recommended that the National Register nomination form for the Barn Bluff Historic District be updated in order to revise the boundaries so that they encompass the entirety of the bluff and correspond to visual boundaries. It is also recommended that the district's areas of significance (and contributing resources) be expanded to include the stone and lime manufacturing industries, the history of which is integral to the formation and preservation of Barn Bluff's present cultural landscape.

Endnotes

¹ Gwen Westerman and Bruce White, *Mni Sota Makoce: The Land of the Dakota* (St. Paul: Minnesota Historical Society Press, 2012); Warren Upham, *Minnesota Place Names: A Geographical Encyclopedia* (St. Paul: Minnesota Historical Society, 2001), 212-213.

² Carol Zellie, "National Register Nomination Form: Barn Bluff" (St. Paul, Minnesota: On file at the Minnesota State Historic Preservation Office, 1989b).

³ Robert R. Page, Cathy A. Gilbert, and Susan A. Dolan, *A Guide to Cultural Landscape Reports: Contents, Process and Techniques* (Washington, D.C.: Department of the Interior, National Park Service, 1998), 36.

⁴ Minnesota Federal Writers' Project, *Minnesota, a State Guide* (New York: Viking Press, 1938), 300.

⁵ Zellie, 1989b.

CHAPTER 2 . HISTORY OF BARN BLUFF

NATURAL HISTORY

To view Barn Bluff from the Mississippi River is to appreciate how distinctive this landmark appeared to Native Americans and EuroAmerican explorers travelling that waterway. Rising dramatically to a height of 334 feet above the water, the orientation of the bluff gives it the appearance of a lone, island afloat in the river (Figure 7).

The singular form of Barn Bluff is the result of its geological formation (Figure 8). Bedrock exposures on the bluff document layers of rock that formed beneath fluctuating Paleozoic seas during the Cambrian and Ordovician periods. Exposed at the base of the bluff are Cambrian sandstones (Franconia Formation, St. Lawrence Formation, and Jordan Sandstone) that began forming a half billion years ago. Capping these layers is approximately 75 feet of Oneota Dolomite that forms the impressive vertical cliffs on the upper portion of the bluff. This sedimentary limestone is composed mainly of calcium carbonate and magnesium that formed at the bottom of a shallow tropical sea that covered most of southern Minnesota during the Ordovician period. Overlying these Paleozoic bedrock layers is a horizon of glacial drift deposited millions of years later. A unique feature of Barn Bluff's geology is the Red Wing Fault, which is visible in the highway cut at the southwest corner of the bluff. Approximately 150 feet of vertical movement along this fault line resulted in the yellow Jordan Sandstone to the north dropping down to a point that it is adjacent to the greenish Franconia Formation on the south.¹



FIGURE 7. BARN BLUFF FROM ACROSS THE MISSISSIPPI RIVER, 1875

(HENNEPIN COUNTY LIBRARY)

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

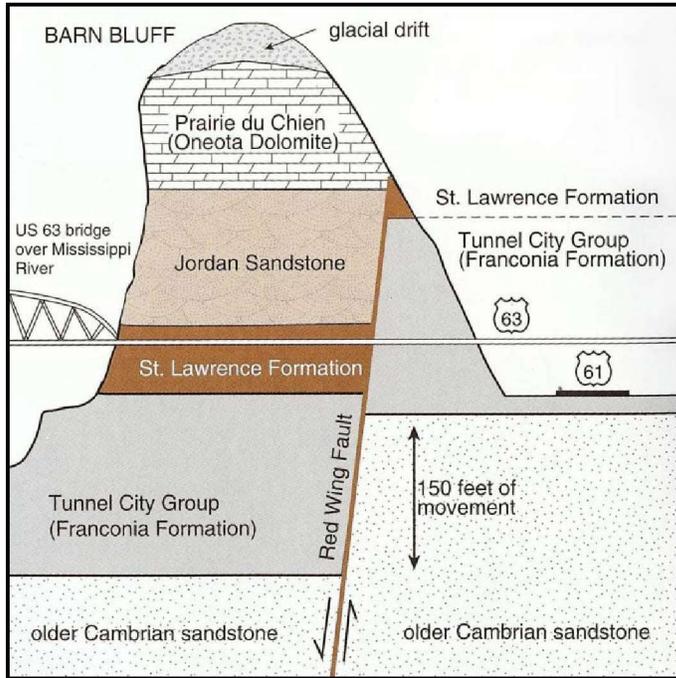


FIGURE 8. GENERALIZED CROSS-SECTION OF BARN BLUFF, VIEW TO THE SOUTH (OJAKANGAS 2009)

owes its existence to its cap of Oneota Dolomite. More resistant to erosion than the underlying sandstone, the dolomite allowed the bluff to withstand the onslaught of post-glacial meltwaters that swept around both sides of the bluff and created of it an island within the wide valley of the Mississippi River. It was also this stratum of limestone in Barn Bluff and neighboring bluffs that would fuel Red Wing's 19th-century stone quarrying and lime manufacturing industries.

The formation of Barn Bluff is reflected not only in its underlying geology, but also in the soils that mantle it (Figure 9). The bluff top is comprised of silt loams of the Timula (TmC) and Timula-Bold (ToD) series that formed from windblown loess.³ These same soils are present atop Sorin's Bluff and the other uplands that surround Red Wing belying their former connection. The upper portion of the bluff's south face is made up of Brodale (BoF) loams.⁴ Derived from eroded bedrock, this soil type is associated with native prairie. The steep, southwest corner of the bluff, bears Marlean (MaF) soils, which are found in deep, side-valley tributaries like the former river channel that once ran along the south side of Barn Bluff.⁵ The Marlean soils and the Timula series on the bluff top above typically support native deciduous forest. Encircling the base of the south half of Barn Bluff are Terrill (TeD) sandy loams.⁶ These soils are created in sediments at the base of valley walls. Similarly, the southeast toe of the bluff is made up of Lindstrom (LnD) silt loams that formed in loess deposits at the base of valley walls.⁷ Both the Terrill and Lindstrom soils, like the Brodale series on the bluff above, supported native prairie. The entire, steep, north face of the bluff is covered in Frontenac (FrF) silt loams that have as their parent material a mixture of loam and eroded limestone. As this portion of the bluff is still, the soils of the Frontenac series are associated with native deciduous hardwood forest.⁸ The outline of these soil units indicates the extent of the landform associated with the geomorphological development of the bluff.

As the last glaciations receded from Minnesota, about 12,000 to 10,000 years ago the modern Mississippi River channel was deeply-carved by large volumes of water breaking free from dammed glacial lakes. Occasionally, torrential floods would cause this ancestral river (Glacial River Warren), to seek new channels. At Red Wing, one such course of the river went to the south of Barn Bluff and carved a now-abandoned river channel from Red Wing to Frontenac.² At the time of Red Wing's initial platting, a backwater slough to the east-southeast of Barn Bluff was still present in a segment of this old valley, but has since been filled. Like so many of the high bluffs visible along U.S. 61 in southeast Minnesota, Barn Bluff

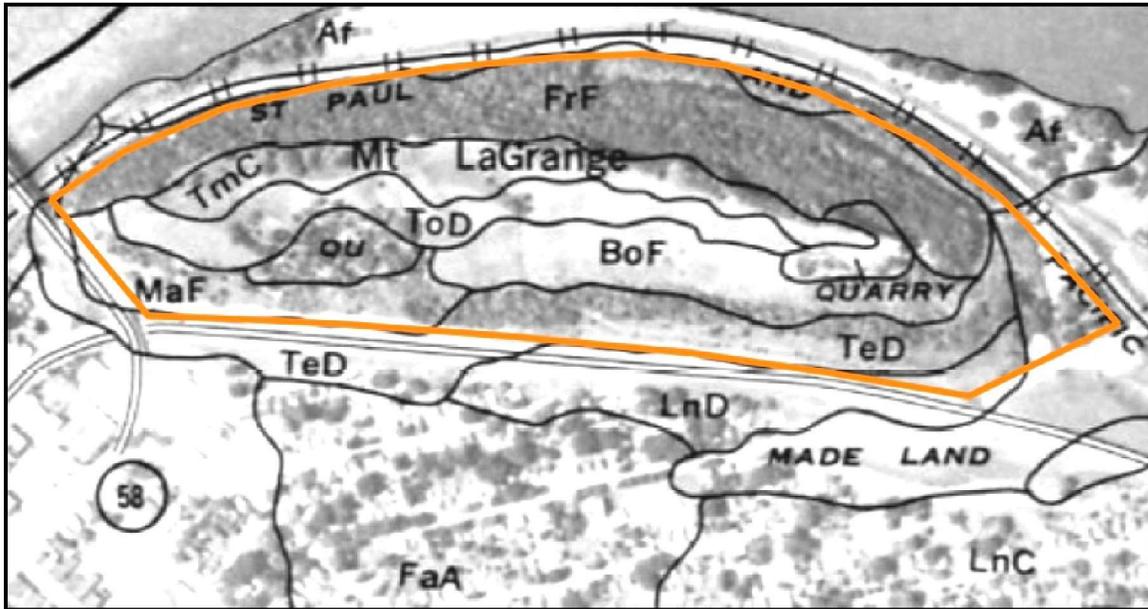


FIGURE 9. STUDY AREA OUTLINED ON THE BARN BLUFF PORTION OF THE GOODHUE COUNTY SOIL SURVEY

NATIVE AMERICAN HERITAGE

The human occupation of Minnesota prior to EuroAmerican contact is divided into four principal cultural traditions:

- Paleoindian (c. 11,200 – c. 7500 B.C.)
- Archaic (c. 7500 – c. 500 B.C.)
- Woodland (1000 B. C. – A.D. 1750)
- Late Prehistoric (A. D. 900 – EuroAmerican contact)

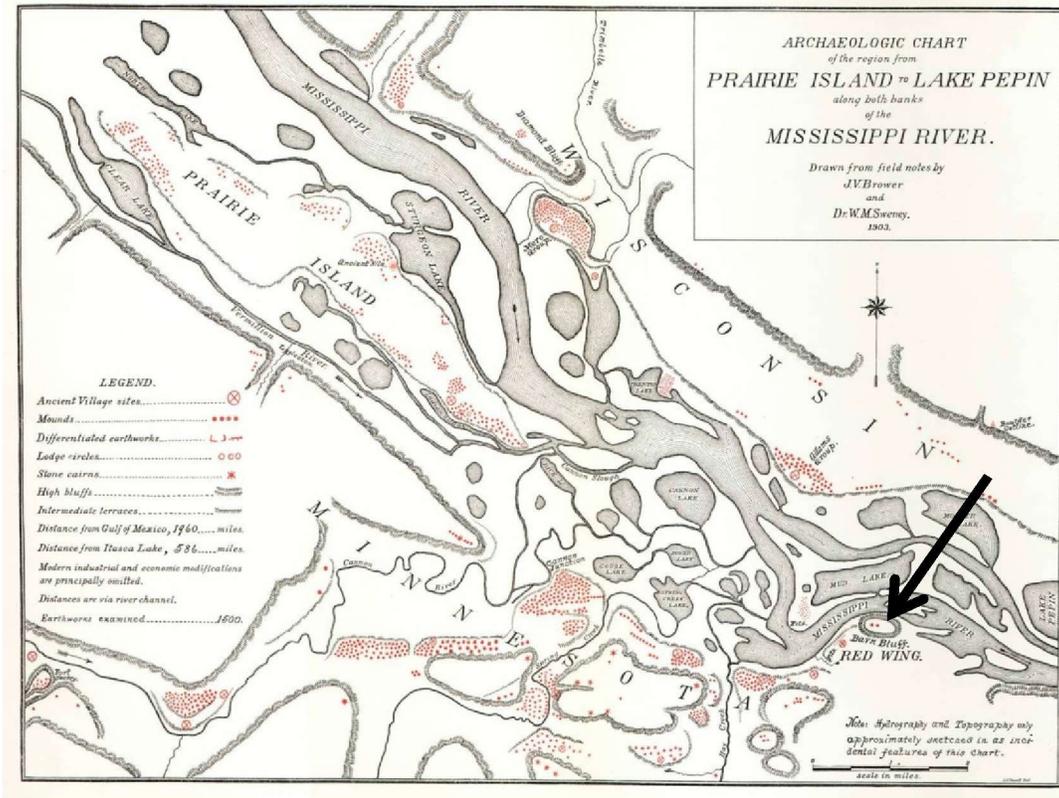
These traditions are primarily defined by technological innovations that are visible in the archaeological record such as changes in forms and types of material culture (e.g., pottery decoration) and variations in subsistence patterns (e.g., hunting, gathering, and cultivation) that occurred in response to a transforming landscape.

As the first humans entered Minnesota some 12,000 years ago following the retreat of the Wisconsin Glaciation, the landscape around Red Wing was still dramatically changing. It wasn't until about 11,000 years ago that the waters of the river slowed to the point that the formation of the gorge ceased.⁹ However, the decrease in water volume within the valley allowed a delta to form at the mouth of the Chippewa River about seven miles south of Red Wing. The Chippewa River delta created Lake Pepin and backed up water within the valley perhaps as far upriver as St. Paul.¹⁰ Over the course of the next 9,000 years the head of Lake Pepin was pushed by the Mississippi delta back downstream reaching its modern position near Red Wing about A.D. ±650.¹¹

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

Given the changing landscape around Red Wing, perhaps it is not surprising that to date archaeological evidence for the occupation of the area during the Paleoindian and Archaic periods is limited.¹² Not only are sites associated with these traditions often deeply-buried and therefore not readily discoverable, but the often inundated and fluctuating environment within the valley at Red Wing may have led to few sites from these eras being preserved in the area. No Paleoindian sites have been discovered in the vicinity of Red Wing and what Archaic materials have been reported are found along the less turbulent Cannon River and Spring Creek.¹³

Only about 1,000 years ago, did the river valley at Red Wing begin to resemble its current configuration as the delta of the Mississippi River reached its present position. It was at this time during the Late Prehistoric period that the fertile Mississippi River valley around Red Wing was intensively utilized by Native Americans, who resided at expansive village sites and created more than 2,000 earthworks in the surrounding area (Figure 10).¹⁴ The environment of this region offered a wide variety of subsistence resources, arable land for farming, and sources of lithic raw material.¹⁵ These resources, together with the transportation, trade, and communication networks offered by the Mississippi and its tributary rivers made this an ideal setting. That Barn Bluff was incorporated into this cultural landscape, referred to by archaeologists as the Red Wing Locality, is evidenced by the presence of mounds atop the bluff and reports of artifacts from this era at the foot of the bluff within what is now present-day Red Wing.



**FIGURE 10. NATIVE AMERICAN EARTHWORKS IN THE RED WING AREA
MAPPED BY BROWER AND SWENEY, 1903**

(ARROW INDICATES BARN BLUFF, BROWER 1903)

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

By the early 19th century, a Mdewakanton Dakota village was present along a spring-fed creek at the base of the bluff – a place they called *He Mni Can* (hill, water, wood). The hereditary leader of the band was called *Koo-poo-hoo-sha* [*Khupahu*, wing; *sha*, red] or *Hhoo-pa-hoo-doo-ta* (the Wing of Scarlet), for the swan's wing, dyed scarlet, which he carried, or *L'Aile Rouge* (the Red Wing) in French.¹⁶ At least four leaders bore this name, each being distinguished by their given name (e.g., *Tatanka-mani* [Walking Buffalo], *Wacouta* [Shooter]).¹⁷ While the exact location of the band's village changed over time, being for a time at *Inyan Bosdatu Wakpa* (Standing Rock River = Cannon River), it is primarily associated with the plain occupied by modern-day Red Wing at the foot of the "hill that appears as if it were in the water."¹⁸

While references to the use of Barn Bluff by the Dakota as a lookout, "a place of safety for women and children in time of war,"¹⁹ and the site where "war parties have offered up their sacrifices previous to going to battle"²⁰ were encountered during the study, the following account of the formation of the bluff appears to be of traditional origin. Repeated with variation in several sources and ascribed in one reference as related by Dakota descendant Thomas La Blanc²¹ the tradition describes a time when a disagreement arose at the site of Red Wing between two Dakota factions – one under the leadership of Remnechee and the other under Wabasha. "Good spirits" prevented the outbreak of war by enveloping the area in darkness accompanied by lightning and the earth's rumbling.²² When daylight returned, half of a great hill that was once there was gone leaving behind what is now Barn Bluff. The other half of the hill, together with Wabasha and his followers, was transported down the Mississippi River. At present-day Winona, the hill (Sugar Loaf) came to rest and there Wabasha's band formed their village. The tradition as related in Curtiss-Wedge's *History of Goodhue County, Minnesota* also makes reference to the burials atop the bluffs and notes that the rattlesnakes that inhabit the bluffs along the river are there to protect the mounds and burials from disturbance.²³



**FIGURE 11. SETH EASTMAN PAINTING OF A DAKOTA VILLAGE ON THE MISSISSIPPI RIVER
NEAR FORT SNELLING, c. 1847**

(MINNESOTA HISTORICAL SOCIETY)

THE DAKOTA VILLAGE AT RED WING AND EUROAMERICAN EXPLORATION

Due to its distinct form, proximity to the river and accessible bluff top offering panoramic views both up and down the river, Barn Bluff is featured repeatedly in accounts of the early exploration of the Upper Mississippi. The bluff is often mentioned in conjunction with descriptions of the nearby Mdewakanton Dakota village.

It is not clear who dubbed the bluff in the French language “Mont La Grange” for its resemblance to a barn, but the name likely originated during the 17th century when the French explored the Mississippi River and established posts at Prairie Island and in the Lake Pepin area.²⁴ In many sources, including the Minnesota Historical Society marker near the entrance to Barn Bluff Park, British explorer Jonathan Carver is cited as being among the first EuroAmericans to have climbed Barn Bluff to admire “the most beautiful prospect that imagination can form.” However, according to the original 1778 account of Carver’s travels (the only version published during his lifetime) as well as subsequent versions of his book, upon reaching Lake Pepin in 1766 Carver finds “a range of mountains on each side” of the river “which in particular parts approach near to it, in others lie at a great distance.”²⁵ He goes on to say of these hills that “In many places pyramids of rocks appeared, resembling old ruinous towers; at other amazing precipices; and what is very remarkable, whilst this scene presented itself on one side, the opposite side of the same mountain was covered with the finest herbage, which gradually ascended to its summit. From thence the most beautiful and extensive prospect that imagination can form opens to your view. Verdant plains, fruitful meadows, numerous islands, and all of these abounding with a variety of trees... but above all, the fine River flowing gently beneath and reaching as far as the eye can extend, by turns attract your admiration and excite your wonder.”²⁶ Certainly Carver’s description gives a sense of how Barn Bluff would have appeared in the late 18th-century, but the account cannot be ascribed with certainty to Barn Bluff.

Rather it is American explorer Zebulon Pike, who provides one of the earliest known descriptions of the bluff itself. Returning downriver the spring of 1806, Pike stopped on April 13th at “the band of the Aile Rouge,” who were then camped at the mouth of the Canon River, and remained there for a day before departing on the 15th.²⁷ On April 14th, he “ascended a high hill called the Barn, from which we had a view of Lake Pepin. The valley through which the Mississippi by numerous channels wound itself to the St Croix; the Cannon River and the lofty hills on each side.”²⁸

Twelve years later in July of 1817 explorer Stephen H. Long while travelling the Mississippi River encountered two Dakota villages in the Red Wing area. The village of “Red Wing, the elder,” was located approximately a half-mile upstream from Barn Bluff, while the “large encampment” of “Red Wing, the younger,” was located farther downriver at Sand Point near present-day Frontenac.²⁹ In his journal entry of July 18, Long postulates on the forces that formed the river valley and provides the following description of Barn Bluff:³⁰

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

During our delay at this place, Mr. H[empstead] & myself ascended a hill about $\frac{1}{2}$ mile far[ther] down the river called the Grange, or barn, of which it has some faint resemblance. Its length is $\frac{3}{4}$ mile & its height about 400 feet. Its acclivity on the river side is precipitous, that on the opposit very abrupt. It is completely insulated from the other hilands in the neighbourhood, which is also the case with many others within a moderate distance tho' not in quite so remarkable a manner; for this is not only surrounded by valleys, but is also nearly insulated by water, an arm or bay [Colvill Bay] of the river entering at the lower end of the hill & extending within 3 or 4 hundred yards of the river above.

Immediately upon the highest part of the Grange is one of the numerous artificial mounds that are to be met with in almost every part of the western world. Its elevation above its base, however, is only about 5 feet...

From the summit of the Grange, the view of the surrounding scenery is surpassed perhaps by very few, if any, of a similar character that the Country and probably the world can afford. The sublime & beautiful are here blended in most enchanting manner, while the prospect has very little to terrify or shock the imagination.

On August 19, 1819, Colonel Leavenworth's expedition to establish Fort Snelling stopped at Red Wing's village, but no description of the village or its setting was given.³¹ In a separate letter, though, Thomas Forsyth, who was on the expedition, notes, "I next halted at a place called the Ground Barn, at the village of Red Wing..."³² The next year, Stephen Kearny was part of a party that arrived at the Red Wing village on the evening of July 22, 1820. He describes the village as having been "established about 10 years since."³³ Not even two weeks later, Henry Schoolcraft's expedition stopped at Red Wing's village on August 3, 1820. Schoolcraft states that the village is "handsomely situated on the west banks of the river, six miles above Lake Pepin" and "consists of four large, and several small lodges, built of logs."³⁴ Like Long, Schoolcraft also climbed Barn Bluff upon which his party encountered rattlesnakes. He recorded the following account of the landform:³⁵

Half a mile east of Red Wing's village there is an isolated mountain, standing upon the brink of the river, called the Grange, from the summit of which you enjoy the most charming prospect. The immense valley of the Mississippi, with the numerous channels and islands of the river--the prairies and forests--with the windings of a number of small rivers which flow into the Mississippi, spread like a map below the eye. The calcareous bluffs which bound this valley, and terminate the prospect towards the west, in a line of lofty grey cliffs, throw an air of grandeur upon the scene, which affords a pleasing contrast with the deep green of the level prairies, and the silvery brightness of the winding river. Turning the eye towards the east, Lake Pepin spreads its ample sheet across the entire valley of the river, from bluff to bluff, and the indentures of its shores recede one behind another, until they become too faint to be distinguished, and are terminated on the line of the horizon. The altitude of this mountain cannot fall short of eight hundred feet above the bed of

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

river. It presents an abrupt mural precipice towards the Mississippi, but slopes off gradually towards the south, and is covered with grass, and a few scattering oaks. Its sides are strewn with beautiful crystals of violet coloured, and radiated quartz, and with masses of iron ore crystallized in cubes and octagons. A specimen of lead ore (*galena*) was also shewn to us by one of Talangamane's people, and a mine is reported to exist in the vicinity, but we could procure no information which is to be relied upon, concerning its situation and extent.

In 1823, Stephen H. Long returned up the Mississippi River. On the evening of June 20, the expedition camped "about 100 yards above Red-Wing's village."³⁶ William H. Keating, who on the Long expedition, published his own account, in which he describes Barn Bluff.³⁷

About four miles above the lake is the site of Redwing's village, at the mouth of the Cannon river. Immediately below the village there is a singular hill, which, from its form, which is supposed to resemble a barn, has been called the Grange, it is about three quarters of a mile long, and four hundred feet high. Its acclivity on the east or river side is very abrupt, on the west or prairie side it is quite vertical; it stands insulated from the rest of the highlands.

The population of the Dakota village at Red Wing was estimated to be 200 in 1823, and 300 in 1852.³⁸ During the 1840s, lodges in the village numbered approximately 22,³⁹ and they were arranged, according to missionary Joseph W. Hancock, "along the river bank near what is now Main street, between Bush and Potter streets."⁴⁰ A cemetery with scaffold burials was observed nearby.⁴¹ In 1849, the Dakota community was "cultivating considerable ground."⁴² The wattle-fenced cornfields extended "some sixty rods east and west" of the spring-fed creek, later known as the Jordan, which flowed through a ravine down to the river, where its mouth provided a harbor for canoes.⁴³ Hancock also observed an event in the summer of 1850 that, while a false alarm, demonstrated the strategic importance of Barn Bluff to the Dakota village. Upon receiving word that a party of "Chippewas" had been seen approaching the village, "all the men gathered their weapons of war and took their canoes and were soon out of sight, in some hiding place along the river. The women and children taking what valuables they could carry, ascended Barn bluff, where they gathered stones and other missiles for self-defense."⁴⁴

The Mdewakanton Dakota village remained at Red Wing until the fall of 1853, when in compliance with the Treaty with the Sioux of 1851 its occupants were removed to a reservation in the Minnesota River valley.⁴⁵

BEGINNINGS OF THE CITY OF RED WING

The land that encompasses Red Wing was not available for EuroAmerican settlement until the 1851 treaties with the Dakota went into effect, yet a small, permanent EuroAmerican presence was introduced at Red Wing in the decades preceding the treaty signings, as missionaries, government farmers, and traders established homes there (Figure 12). Among the first to arrive was the family of missionary Samuel Denton in 1836. From that year until 1846, he and fellow missionary Daniel Gavin and their families operated a mission under the auspices of the Committee of Missionaries of Lausanne, Switzerland.⁴⁶ In the spring of 1837, the Reverend Alfred Brunson, while ascending the Mississippi River, stopped to visit the mission at Red Wing located at the base of Barn Bluff of which he wrote:⁴⁷

“The mission house was at the foot of a hill running some three or four miles down the river, a singular formation of nature, being one continuous ridge, nearly perpendicular on both sides. At the west or upper end is a cliff of perpendicular rocks, which, from its shape and size, is called “the barn rock.”

In 1848, a new mission was begun at Red Wing by Joseph W. Hancock and John F. Aiton through the American Board of Commissioners of Foreign Missions.⁴⁸ Hancock described the sight of distant Barn Bluff upon their arrival:⁴⁹

He [Henry M. Rice] pointed out to us the top of Barn bluff while our steamer was somewhere in Lake Pepin, and told us that it marked the place where we were to land. Peculiar sensations were felt by us at the sight of that bold bluff standing in the middle of the great valley through which our steamer was plowing its way.

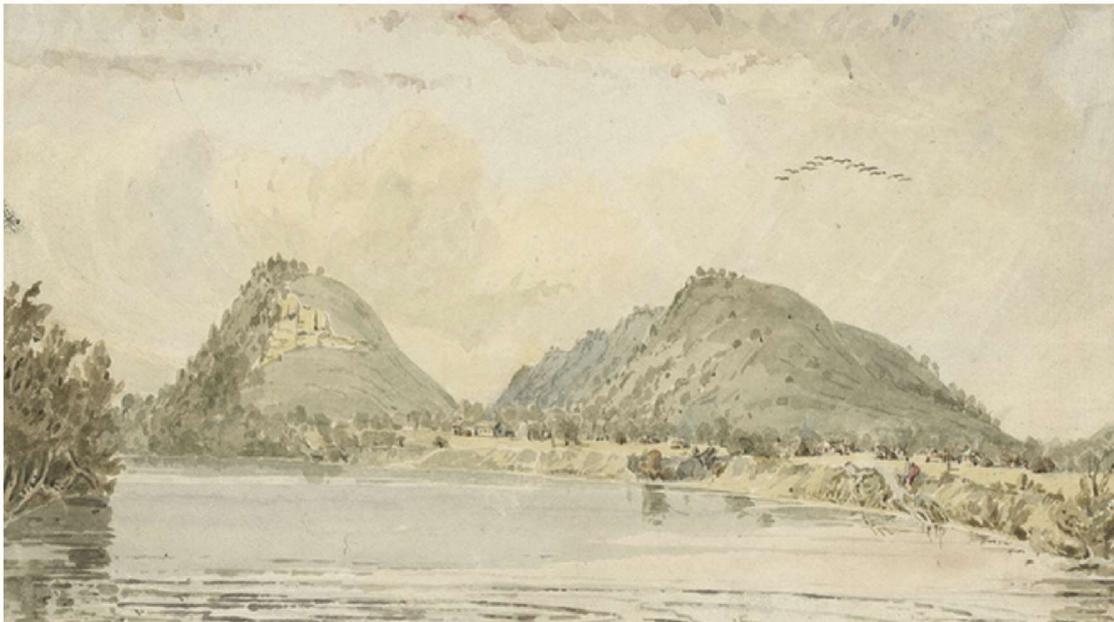


FIGURE 12. BARN BLUFF (LEFT) AND RED WING'S VILLAGE BY SETH EASTMAN, c. 1847

(MINNESOTA HISTORICAL SOCIETY)

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT



**FIGURE 13. RED WING AND BARN BLUFF (CIRCLED) ON THE GENERAL
LAND OFFICE SURVEY MAP, 1856**

According to the census of the Territory of Minnesota taken in 1849, 33 EuroAmericans (20 males and 13 females) were residing at Red Wing⁵⁰ near the approximately 22 Dakota lodges also present during this period.⁵¹ However, with the ratification of the 1851 treaty, the population and landscape of Red Wing underwent a rapid change. Claims were made by recently arrived individuals as well those already present within the settlement. Missionary Joseph Hancock was among the first settlers, and he remained at Red Wing after the Dakota were removed organizing and leading the First Presbyterian church.⁵²

The town of Red Wing was platted in 1853 with Barn Bluff as the east terminus of Main Street. That same year it became the Goodhue County seat and in 1855 it took on the role of regional land office. Commercial farming was soon underway within Red Wing proper and the surrounding rural areas,⁵³ and the wheat grown in 1854 “was found to be of a most superior quality, and the marketing and shipping of this cereal gave Red Wing its first start as a business point.”⁵⁴ As a river port in the years before the railroad, Red Wing was well-positioned to be a large primary wheat market, as buyers had easy access to the town and could readily ship wheat once purchased. Beyond agriculture, Red Wing’s natural resources and position on the river made it ideal for a number of other small-scale industries that readily took hold while the city grew in the mid-1850s and 1860s, including brick manufacturing, sawmilling, and flour milling early on, then pottery manufacture beginning in the mid-1860s.⁵⁵

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

During this era, the scenery of Lake Pepin and Red Wing was a feature of the “Fashionable Tour” of the Upper Mississippi.⁵⁶ Tourists travelling first by steamboat, and later by rail, took in the sights of the river. The 1854 “Rock Island Railroad Excursion,” more commonly referred to as the “Grand Excursion,” alone brought over a 1,000 people up the river.⁵⁷ Inspired by the sights, artists, poets, and writers documented the scenery of the region including Barn Bluff. Among the visitors that came to Red Wing was writer, natural historian, and philosopher, Henry David Thoreau, who took in the views offered by Barn Bluff just one year before his death. Reading his mail and penning a letter atop the bluff on June 26, 1861, Thoreau wrote that he was:

...near the top of a remarkable isolated bluff here, called Barn Bluff, or the Grange, or Redwing Bluff, some four hundred and fifty feet high, and half a mile long, - a bit of the main bluff or bank standing alone. The top, as you know, rises to the general level of the surrounding country, the river having eaten out so much. Yet the valley just above and below this (we are at the head of Lake Pepin) must be three or four miles wide.⁵⁸

With a sizeable population in place, and buildings containing everything from banks to billiard halls, churches to a courthouse, grocery stores to jewelry stores, and telegraph offices to newspaper offices,⁵⁹ the urbanization of the Red Wing was nearly complete by the end of the 1860s. In 1870, a wave of immigration brought the population of Red Wing to over 5,200.⁶⁰ Through much of this growth of the city at the foot of the bluff, the landmark of Barn Bluff remained unchanged, its height being used each spring to watch for the first steamboats coming up the river (Figure 14).⁶¹ However, what Red Wing needed to be truly viable, and freed from the limitations of the annually frozen river, was a railroad. Its introduction would result in the first extensive alterations to the bluff.

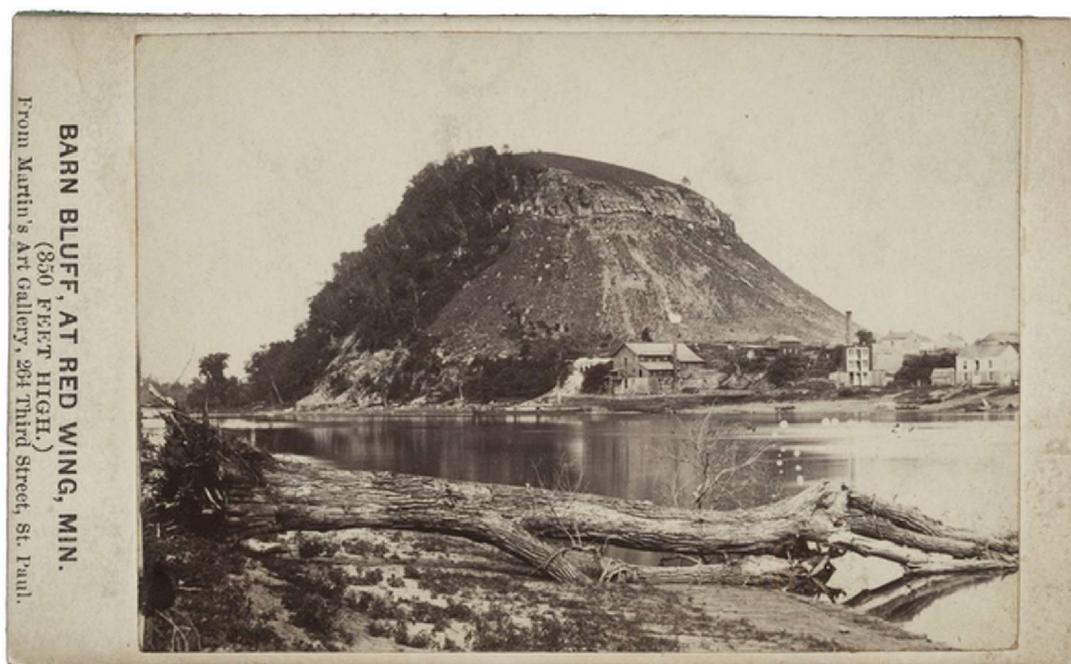


FIGURE 14. BARN BLUFF AND RED WING, c. 1865
(MINNESOTA HISTORICAL SOCIETY)

RAILROAD DEVELOPMENT

The City of Red Wing's earliest attempt at obtaining a railroad occurred during the 1863-64 fiscal year, when the city council "adopted a plan for surveying a railroad from Winona to St. Paul, the city offering to pay seven per cent interest to anyone who would advance money for the project," but there were no takers.⁶² Within a few years, however, the St. Paul and Chicago Railroad Company had been incorporated to build a Mississippi River route from St. Paul to Winona, with construction beginning in St. Paul in 1869. This railroad connected Red Wing with Hastings in September of 1870, and was subsequently extended beyond Winona to La Crescent in 1872, shortly after which the St. Paul and Chicago was purchased by the Milwaukee and St. Paul Railway

Company, which became the Chicago, Milwaukee, and St. Paul (CM&StP) in 1874.⁶³ The riverside line was part of the CM&StP main line from Chicago and by the early 1880s it extended beyond Minneapolis to South Dakota,⁶⁴ linking Red Wing not only to the urban centers of the Twin Cities and Chicago, but also to inland agricultural markets and wheat sources to the west.

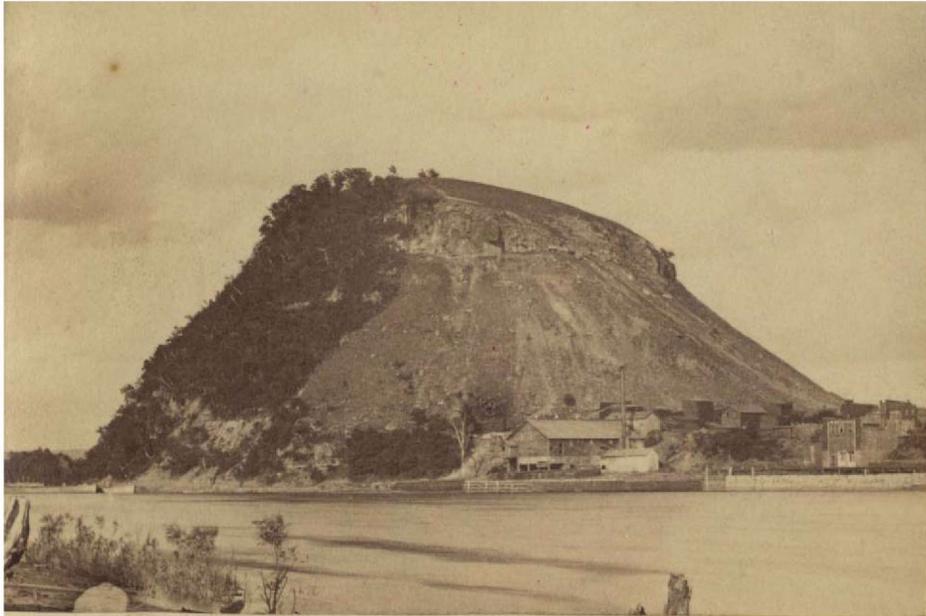


FIGURE 15. BARN BLUFF ON A PLAT OF RED WING, 1874
(CAMPBELL 1874)

The railroad's route through Red Wing closely paralleled the Mississippi River (Figure 15). The proximity of the rail corridor and steamboat levee allowed industrial concerns located along the riverfront to take advantage of both methods of transportation. In 1873, Bluff Mill was constructed at the northwest foot of Barn Bluff. Between 1873 and 1877, several additional mills (Bluff, Diamond, Red Wing, and La Grange) were constructed along the city's rail line.⁶⁵ By 1880, large grain warehouses belonging to other concerns lined the railroad between the Red Wing and La Grange mills.⁶⁶ Other 1870s enterprises not located directly on the railroad were established nearby in the city's quickly growing downtown. These businesses included numerous retail stores that received their wares via the railroad, factories that obtained raw materials and shipped finished goods via rail, and hotels that enjoyed a substantial new clientele of rail passengers. Of note is the St. James Hotel, financed through a joint stock company by citizens of Red Wing and completed in 1875, after being deemed necessary to reflect the city's status as "one of the leading business centers of Minnesota and the Northwest."⁶⁷ Foundation stone for this impressive structure was quarried from Red Wing's bluffs by G. A. Carlson.⁶⁸

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

To the east of downtown Red Wing the route of the railroad skirted around the north side of Barn Bluff. Here where the steep north face of the bluff nearly met the water, construction of the railroad, necessitated that the base of the bluff be cut back and fill introduced to create a suitably wide and level bed for the rail line (Figure 16).



**FIGURE 16. BARN BLUFF BEFORE AND AFTER RAILROAD CONSTRUCTION
VIEW TO SOUTHEAST (TOP C. 1870, BOTTOM 1900)**

(TOP AND BOTTOM: MINNESOTA HISTORICAL SOCIETY)

STONE QUARRYING AND LIME MANUFACTURING INDUSTRIES

Among the enterprises of Red Wing that benefitted from the city's combination of readily available raw material and river and rail transportation was the quarrying of stone and the production of lime. These industries also played the greatest role in shaping the present landscape of Barn Bluff.

The exposed stone on the Barn Bluff and the neighboring hills surrounding Red Wing provided a ready source of building material. The first reported production of lime in Red Wing was undertaken by mason Phineas Fish, who for a time in the 1850s operated a kiln near the west foot of Barn Bluff using stone that had fallen from the bluff's face.⁶⁹ As the area began to thrive in the 1860s, small quarries and lime kilns began appearing on many bluffs in the region, including on Barn Bluff where stone quarrying reportedly began in 1865.⁷⁰ Stone from the quarries of G. A. Carlson on Barn and Sorin's bluffs not only supplied local buildings like the St. James Hotel and the Episcopal Church, but also projects beyond Red Wing including the stone piers of the railroad bridge at Hastings and the 1878 stone arch bridge over the east channel of the Mississippi River at Minneapolis.⁷¹ However, it was not until the 1870s that the lime industry advanced in Red Wing. This escalation was in part due to the introduction of the patent-kiln, also known as a perpetual kiln, which allowed limestone to be loaded into and the lime extracted from the kiln continuously without stopping the firing process.⁷² At its peak, from c.1870-c.1908, there were as many as 16 quarrying companies in operation at any one time in the Red Wing area, with the majority of the larger quarries and kilns located on Barn and Sorin's bluffs on the eastern edge of Red Wing.⁷³ During this time Barn Bluff was largely divided amongst the holdings of three lime manufacturers: F. J. Linne (1870s-1890), the Twin City Lime and Cement Company (1888-c.1900), and G. A. Carlson (later H. L. Olson) (c.1863-c.1900) (Figure 17).

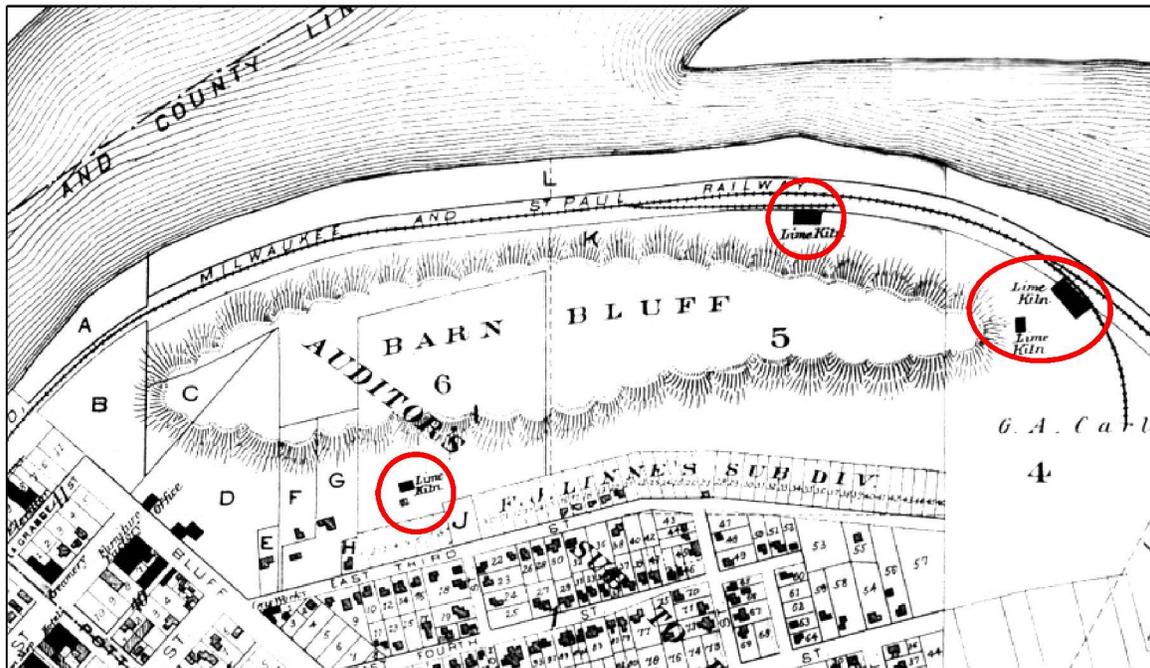


FIGURE 17. PLAT OF BARN BLUFF SHOWING KILN LOCATIONS (CIRCLED), 1894

(FOOTE AND HENION, 1894)

The operations of F. J. Linne consisted of a stone quarry and twin lime kilns on the south side of Barn Bluff overlooking East Red Wing (Figure 18). The Linne Kilns, established in 1879, continued in operation through 1890.⁷⁴ In that year, with the south side quarry nearly exhausted, F. J. Linne and business partners, who had formed the Twin City Lime and Cement Company in 1889, took over the holdings of the Red Wing Lime and Stone Company which had begun on the north side of the bluff in 1888.⁷⁵



FIGURE 18. CREW OF UTILITY WORKERS BELOW THE LINNE LIME KILNS ON BARN BLUFF, 1893

(MINNESOTA HISTORICAL SOCIETY)

The north side kilns were located at the base of the bluff immediately adjacent to a railroad siding. As the quarries that fed the kilns were located on the upper portion of the bluff high above the kilns, a trestle and rail car system was constructed to bring the quarried stone down the steep bluff to the kilns.⁷⁶ The kilns of the Twin City Lime and Cement Company were also unique in that the firebrick-lined burn chambers were encased in sheet metal rather than enclosed within a limestone structure as was typical of the other Red Wing kilns (Figure 19). In 1893, they recorded a production of 40,000 barrels of lime annually and employed 25 men, but operations were not full time due to a lack of demand.⁷⁷ The north side quarry and kilns continued in operation through about 1900.⁷⁸



FIGURE 19. TWIN CITY LIME AND CEMENT COMPANY'S KILNS AT THE FOOT OF BARN BLUFF'S NORTH FACE

(GOODHUE COUNTY HISTORICAL SOCIETY)

The most expansive lime and stone quarrying operation on Barn Bluff was that of Gustavus Adolphus Carlson. G. A. Carlson owned and operated the Red Wing Pioneer Lime Works complex consisting of a quarry and two lime kilns on the east end of Barn Bluff, and two more kilns and quarries on Sorin's Bluff. Carlson's first kiln was located on East 7th Street at the foot of Sorin's Bluff. Having arrived in Red Wing in 1856, Carlson began producing lime in a periodic kiln at this location as early as 1863.⁷⁹ In 1871, he opened the Red Wing Pioneer Lime Works combining his East 7th Street operations with the development of a novel perpetual "tunnel" kiln on the northeast corner of Barn Bluff.

An innovative design, the tunnel kiln, constructed in 1872, was the first of Carlson's kilns on Barn Bluff. Very similar to Andrew Danielson's slightly later tunnel kiln (1873/4) on Sorin's Bluff (with which it is sometimes conflated),⁸⁰ Carlson's tunnel kiln connected directly to the quarry floor. The operation consisted of a 90 foot vertical shaft, giving way to a fire box which connected to a 150 foot horizontal tunnel.⁸¹ The interior of the tunnel contained rails that facilitated the transport of the finished lime to the lime house. This kiln's entire process thus made efficient use of gravity as limestone rubble was deposited directly into the kiln shaft from the floor of the quarry and then the finished lime was loaded into tram cars and rolled down the tunnel. Packed lime was then carted down the bluff on a series of switch back roads to the rail spur at the foot of the bluff where it was loaded for shipment.

In 1878, Carlson's two perpetual kilns [tunnel kiln and East 7th Street] were producing 18,000 barrels of lime annually.⁸² Yet, Carlson was not able to keep up with demand for his lime. Therefore, in 1882 he built a new improved kiln complex on Barn Bluff directly below the tunnel kiln.⁸³ This lime works consisted of two perpetual kilns enclosed within a single limestone structure built into the base of the bluff and immediately adjacent to the railroad spur (Figure 20). The complex also included an attached lime dry house and a "lime and cement depot," while a stone yard accessed by cart roads and equipped with a pole derrick was located a little further to the east. The kiln complexes on Barn and Sorin's bluffs ran concurrently for many years, at one point recording 85,000 barrels being shipped annually out of the facilities.⁸⁴

By 1888, the massive amount of fuel demanded by the myriad lime and stone companies and other industries operating in and around Red Wing, had completely consumed the wood supply for miles around the city. Carlson had taken to having slab (unusable outer cuts of logs generated by saw mills) shipped down from Stillwater, Minnesota to fire his kilns.⁸⁵ As even that supply began to be unreliable and more costly, Carlson cast around for an alternative. Carlson undertook the design and building of six new "gas fired" kilns on Sorin's Bluff.⁸⁶ While a St. Paul article in 1892 states the kilns are operational, it is clear the project is complicated, inefficient, and fraught with setbacks. The same year, *The Red Wing Republican* reports that Carlson is still tweaking his new gas kilns.⁸⁷



FIGURE 20. G. A. CARLSON'S 1882 KILN AND LIME WORKS
(GOODHUE COUNTY HISTORICAL SOCIETY)

At his peak, G. A. Carlson was running 11 lime kilns, two quarries supplying both cut limestone for building and raw stone for quicklime, employed 65 men and had offices in Red Wing, St. Paul, and Minneapolis.⁸⁸ His business shipped out roughly 520 barrels of lime, used 20 cords of wood a day, and made \$75,000 annually.⁸⁹ At various points he was an alderman and city council president, an original investor in the new gas and power plants in Red Wing, and generally a leader of industry. Nevertheless, the experimental kilns on Sorin's Bluff did not perform as planned, with much of the heat escaping the kiln and resulting in incomplete burns.⁹⁰ The gas-fired kilns are ultimately unsuccessful and the expense, perhaps exacerbated by the financial panic of 1893, bankrupts the once prosperous Carlson by 1894. As a result of his financial failure, Carlson's works on Barn Bluff fell under the new ownership of H.L. Olson in 1894. Carlson died penniless in 1903 at the age of 67. Olson continued to run the lime works and quarries for a few more years, however, by the early 20th century increasing costs of fuel, coupled with a decrease in the use of lime in favor of other materials, such as concrete blocks and Portland cement, led to an irreversible decline in the stone and lime manufacturing industries.⁹¹

As the removal of limestone from the bluff in support of the building industry declined, a new demand renewed quarrying of stone from Barn Bluff at an intensive pace. The Milwaukee Road's construction of a new double track along the river necessitated riprap along the shoreline. In 1906, the railroad took out a five-year lease on part of the bluff for the purpose of securing stone.⁹² Contractor L. H. Gray Company converted the former G. A. Carlson tunnel kiln into a storage facility for blasting materials and began "wrecking the bluff" with "tremendous rapidity" to fulfill a contract for 200,000 cubic feet of stone for the railroad.⁹³ The size of the charges being used and the extent to which

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

they were disrupting life in East Red Wing, across the city, and into Wisconsin was the subject of much newspaper commentary.⁹⁴ The work was also proving dangerous resulting in a variety of accidents and injuries.⁹⁵ A January 24, 1907 blast injured six workers and falling rock claimed the life of a crew member on February 8.⁹⁶ A public outcry, fueled in part by the editor of the Red Wing *Daily Republican*, Jens K. Grondahl, followed “against the vandalistic way the dear old Sentinel of the Mississippi Valley was being sacrificed for a few sheckles.”⁹⁷ Appeals to the president of the railroad signed by Red Wing’s leading shippers eventually met with success and quarrying was halted in May of 1908.⁹⁸ The *Red Wing Daily Republican* advocated, “The people of Red Wing should now go to work and acquire the bluff and insure its permanent preservation.”⁹⁹



FIGURE 21. QUARRIES ON THE EAST END OF BARN BLUFF, c. 1895, VIEW TO NORTHWEST
(MINNESOTA HISTORICAL SOCIETY)

PUBLIC PARK FORMATION

The idea of Barn Bluff being a city park dates back nearly to the city's founding. In 1874, Dr. W. W. Sweney, who then owned approximately the western two-thirds of the bluff, offered to donate the land to the city for use as a park with the caveat that a road be built to the bluff's summit.¹⁰⁰ Local paper, *The Grange Advance*, supported the notion with an appeal on March 4 to the city's business owners.¹⁰¹

Why don't our livery stable men, or our hotel keepers, or in fact, any body but ourselves, go to work and build a good carriage road to the top of Barn Bluff and then make a nice drive way on the top. We understand that the right of way can be had free. No one ever comes to Red Wing, who is not seized with a desire to place that bluff beneath his feet. It has done more than anything except the wheat business to make Red Wing famous. A good carriage way to the top, of Barn Bluff would do full as much as a first class hotel to make Red Wing a favorite resort for tourists, and health seekers. Let somebody wake up upon this matter at once.

Steps were taken in July 1874 to assess whether building a road up the bluff was even practical.¹⁰²

On Monday City Engineer Danforth took a measurement of Barn Bluff with a view of ascertaining the practicability of a street up, in view of converting the Bluff into a City Park. The height above Bluff street at the head of Main street. is 278 feet, and that a road could be constructed up the Bluff with a rise of fourteen feet in every one hundred, which is only twice as great as the grade of Bush Street from Main street to the river. It had been thought that a road with 16 to 18 feet rise to every one hundred feet would be all that could be expected. The grade is by no means a difficult one, and when a street is constructed it will be one of the handsomest drives in the city. Let us have a park of which the city can be proud, and let that be on old Barn Bluff.

However, mapmaker George Richard's inclusion of a "carriage drive to Barn Bluff park" in his 1874 panoramic of Red Wing was apparently optimistic, because no action was taken on Dr. Sweney's offer in that year nor during the following annual cycle (1875-76) when a citizen committee of C. C. Webster, E. L. Baker, J. C. Pierce, Jesse McIntire, and E. T. Wilder was appointed to once again consider the proposal.¹⁰³ At a June 4, 1877, City Council meeting, a motion to accept the offer prevailed on the condition that right of way for the planned road could be obtained "upon reasonable terms."¹⁰⁴ The same citizen committee was charged with securing the right of way, but apparently did not meet with success as the 1879-80 City Council again appointed a committee to consider the offer.¹⁰⁵ While efforts were made to improve the bluff including the planting of trees, "People, however, persisted in cutting down the planted sapling for whips and in otherwise despoiling the place, so after many discouragements, the committee decided not to accept the proffered gift."¹⁰⁶ It wasn't until after the cessation of quarrying on the bluff in 1908 that the city rejoined the discussions of forming a park that encompassed the bluff. In 1910, a philanthropic coalition of Barn Bluff landowners (the Bank of Pierce, Simmons & Company, the Red Wing Manufacturing Company, and C. A. Betcher) donated their holdings to the city, while James Lawther gave \$2,000 towards the eventual \$5,000 expended, with the result that by 1911, the city held 48 acres of Barn Bluff.¹⁰⁷

The principal challenge to the enjoyment of Barn Bluff has always been access to the bluff top (Figure 22). It was the citizens of Red Wing that eventually took it upon themselves to improve the route to the summit thereby beginning a long history continuing to this day of community and service organizations being involved in the development and maintenance of the bluff. Red Wing postmaster, Charles C. Webster, is credited with leading an effort to create a trail up the west face of the bluff in 1889.¹⁰⁸



FIGURE 22. BARN BLUFF CLIMBERS, 1900
(GOODHUE COUNTY HISTORICAL SOCIETY)

Henry Peter Bosse's 1891 photograph of Barn Bluff, clearly shows the new path winding its way to the summit (Figure 23). The Red Wing Civic League, formed in 1903, maintained and improved the trail, which was dubbed "Webster's Way." The Civic League invited the participation of the high school senior class, which twice a year took a half-day to perform upkeep on the path after which they were rewarded with a bluff-top picnic.¹⁰⁹ Among those who looked after the bluff, was Civic League vice-president, and noted anthropologist, Frances Densmore, who devoted her attentions to "the ledge on Barn Bluff, which now provides so excellent a spot for picnic parties."¹¹⁰ The Civic League, under the direction of A. W. Pratt, also organized a work day in which the stores of Red Wing closed, a band played, and the "business and professional men of Red Wing donned overalls" and rebuilt the path leading up Barn Bluff (Figure 24).¹¹¹

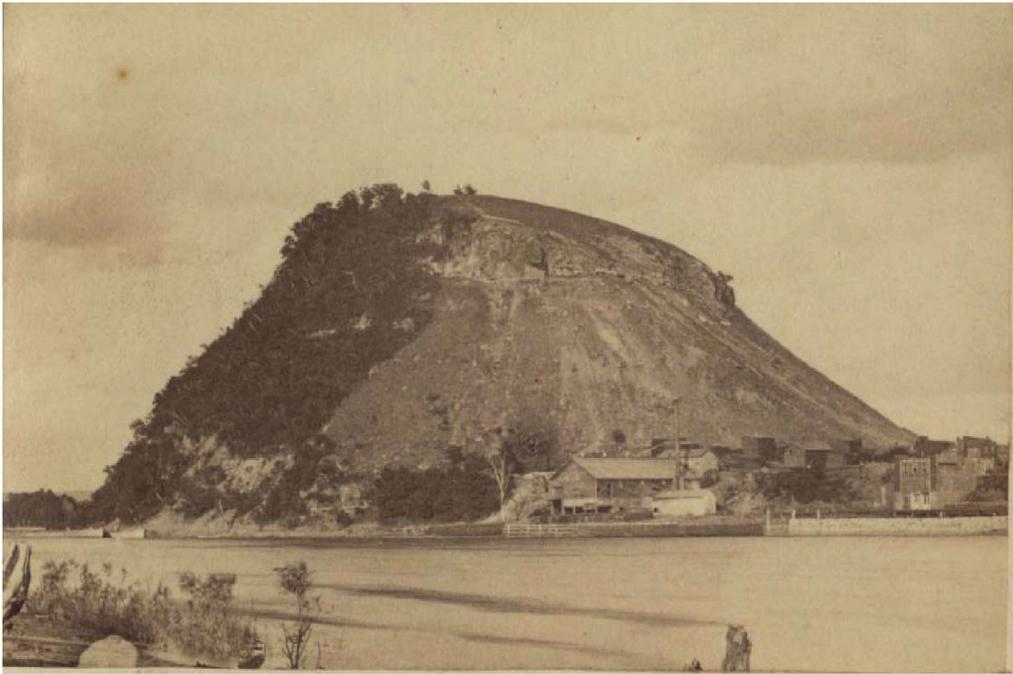


FIGURE 23. THE WEST FACE OF BARN BLUFF BEFORE AND AFTER THE CONSTRUCTION OF WEBSTER'S WAY (TOP c. 1870, BOTTOM 1891)

(TOP: MINNESOTA HISTORICAL SOCIETY; BOTTOM: UNITED STATES ARMY CORPS OF ENGINEERS - HENRY PETER BOSSE, PLATE 60)

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT



FIGURE 24. WORKING ON WEBSTER'S WAY

(GOODHUE COUNTY HISTORICAL SOCIETY)

The most ambitious park improvement project ever undertaken on the bluff was the construction of the Citizen's Memorial Stairway (West Kiwanis Stairway) which was completed in August of 1929 (Figures 25 and 26). Like the creation and maintenance of its predecessor "Webster's Way," the new stairway was a community undertaking. Under the direction of the local Kiwanis Club, funds were raised through events and the sponsorship of steps into which the donors name were cast. Contractor C. Walter Johnson was hired to build the stairway and the city provided the necessary sand and gravel. Following the general alignment of Webster's Way, the elevated concrete stairway began at the east end of Main Street and from that point snaked its way up the west face of Barn Bluff. In the end, it took 472 steps, eight large platforms, and 12 small platforms to reach the summit of the bluff.¹¹² In time, a tile-roofed shelter was constructed over the first landing. The final cost was approximately \$7,000 (Figure 26).

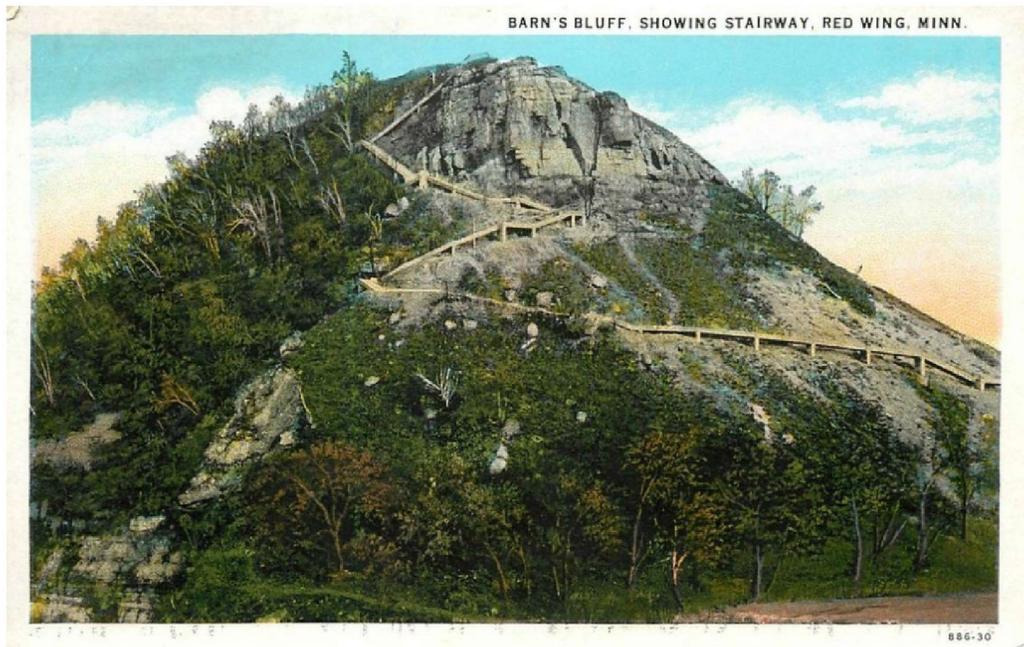


FIGURE 25. THE CITIZEN'S MEMORIAL STAIRWAY

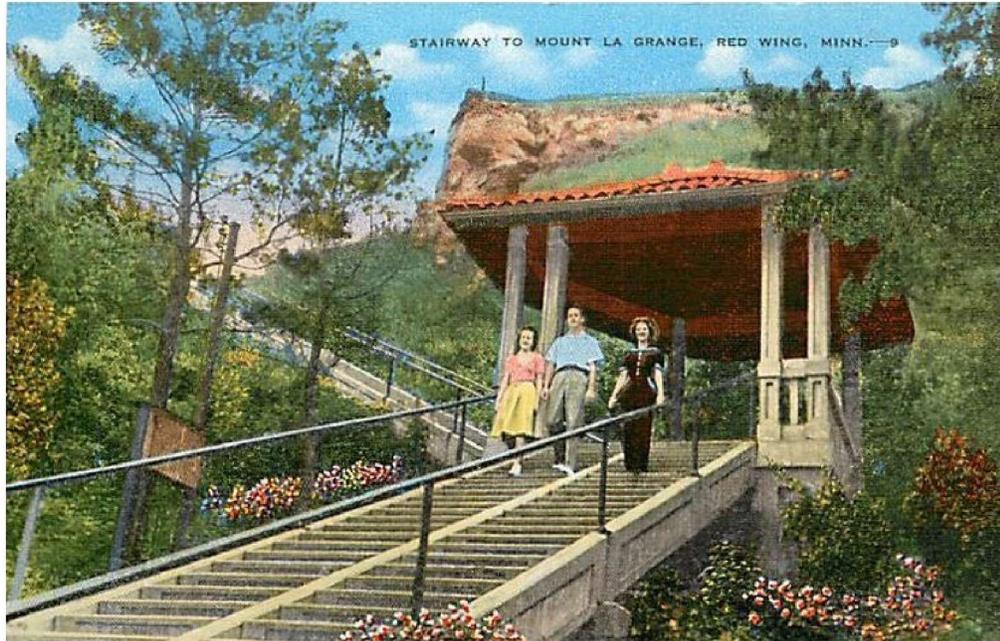


FIGURE 26. "STAIRWAY TO MOUNT LA GRANGE"

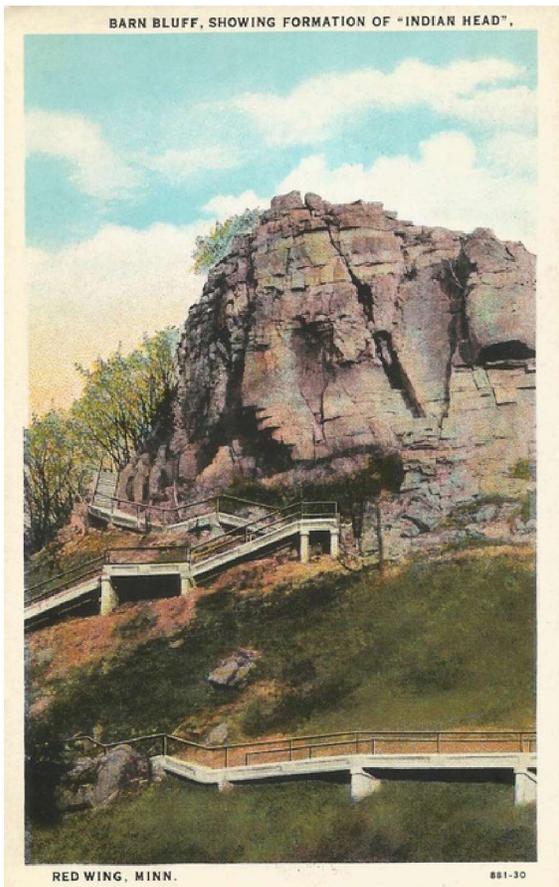


FIGURE 27. BARN BLUFF'S "INDIAN HEAD"
ROCK FORMATION

For approximately 30 years, the Citizens Memorial Stairway offered visitors to Red Wing and its citizens a convenient means to reach the summit of Barn Bluff. However, in the late 1950s, the replacement of the wagon bridge over the Mississippi River with a new high bridge necessitated the removal of the stairway. In order to create a touchdown for the new bridge, which was built between the alignment of the wagon bridge and Barn Bluff, a portion of the west end of the bluff was blasted away (Figure 28). Only the uppermost two landings, the overlook, and 120 steps of the Citizens Memorial Stairway were left in place. Those steps that could be salvaged were saved. The blasting also resulted in the loss of the "Indian Head" rock formation, which was one of the features of the bluff highlighted by the stairway (Figure 27).¹¹³ At the same time, to provide for highway connections to the bridge, portions of the south side of the bluff were also removed as well as 87 homes in Red Wing's East End (Figure 29).¹¹⁴

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

How best to restore the connection between downtown Red Wing and Barn Bluff was the subject of discussion during the 1960s. The steeper incline that the west face now presented was daunting and any approach from either the west or south was made further difficult by the bridge and highway that now encircled the base of the bluff. Options considered included an elevator, a funicular, and the creation of a new path.¹¹⁵ Steps went so far that a prototype of a self-propelled gondola/aerial bus was installed by the Big Rock Mountain Corporation in the mid-1960s with the result that in 1964, 3,500 passengers rode a cable car between Levee Park and the bluff top.¹¹⁶ However, this and other options to restoring the west approach appear to not have been financially viable.

Given these constraints, and the railroad to the north, access to the bluff top could only be established on the opposite side of the bluff from downtown. In 1975-76, using over 100 steps salvaged from the Citizens Memorial Stairway, the Kiwanis created a new stairway and park entrance at the east end of Barn Bluff. From the East Kiwanis Stairway a new trail (South Trail) was created to once again provide access to the bluff top. Through the continued efforts of the Kiwanis, donations were raised for 94 new steps. The resulting Central Kiwanis Stairway was constructed in 1982 at the steepest segment of the South Trail. Both the 1976 and 1982 stairways evoke the 1929 Citizen's Memorial Stairway through not only the incorporation of original steps, but also in the continued practice in 1982 of impressing donors' names in new steps. The construction of each of the stairways also features outer curbs and a central dividing curb in flights that are two steps wide, as well as the use of steel pipe handrails.

Endnotes

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- ¹ Richard W. Ojakangas, *Roadside Geology of Minnesota* (Missoula, Montana: Mountain Press Publishing Company, 2009), 304; Reinhold J. Kosec, "Minnesota Environmental Resources Survey: Barn Bluff," 1970. On file at the Minnesota State Historic Preservation Office (21GD15), St. Paul.
- ² Calvin R. Fremling, *Immortal River: The Upper Mississippi in Ancient and Modern Times* (Madison: The University of Wisconsin Press, 2005), 79
- ³ George A. Poch, *Soil Survey of Goodhue County, Minnesota* (Washington, D.C.: Department of Agriculture, Soil Conservation Service, 1976), p. 57-58.
- ⁴ *Ibid.*, 15.
- ⁵ *Ibid.*, 37-38.
- ⁶ *Ibid.*, 57.
- ⁷ *Ibid.*, 36-37.
- ⁸ *Ibid.*, 27.
- ⁹ Herbert E. Wright, Jr., K. Lease and S. Johnson, "Glacial River Warren, Lake Pepin, and the Environmental History of Southeastern Minnesota," in *Contributions to Quaternary Studies in Minnesota*, ed. Carrie J. Patterson and Herbert E. Wright, *Minnesota Geological Survey Reports of Investigations* 49 (1998): 134, 135.
- ¹⁰ Wright et al., 1998:134.
- ¹¹ Curtis M. Hudak, "Geomorphic Investigation of the State Trunk Highway 63 Bridge over the Mississippi River, Red Wing, Minnesota," (Lake Elmo, Minnesota: Foth Infrastructure and Environment, LLC, 2011); Curtis M. Hudak, Edwin R. Hajic and Jeffery J. Walsh, "Interpreting the Origins of Landform Sediment Assemblages within the Upper Mississippi River Valley and Tributaries in the Twin Cities Area of Minnesota," in *Archaeology to Anthropocene: Field Guide to The Geology of the Mid-Continent of North America*, ed. J. D. Miller, G. J. Hudak, C. Wittkop, and P. I. MacLaughlin, *Geological Society of America Field Guide* 24 (2011).
- ¹² Clark A. Dobbs, "An Archaeological Survey of the City of Red Wing, Minnesota," *Reports of Investigations Number 2*, (Minneapolis: The Institute for Minnesota Archaeology, 1985), 15, 16.; A. A. Buhta, J. L. Hofman, E. C. Grimm, R. D. Mandel, and L. A. Hannus, "Investigating the Earliest Human Occupation of Minnesota: A Multidisciplinary Approach to Modeling Landform Suitability & Site Distribution Probability for the State's

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

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¹³ Dobbs, 1985:16.

¹⁴ Institute for Minnesota Archaeology, “Red Wing Locality,” From Site to Story: the Upper Mississippi’s Buried Past (<http://www.fromsitetostory.org/rwl/rwlintro.asp#top>), 1999; Edward P. Fleming, “Community and Aggregation in the Upper Mississippi River Valley: The Red Wing Locality” (PhD diss., University of Minnesota, 2009), 6, 11, 15.

¹⁵ Dobbs, 1985:7-8

¹⁶ Franklin Curtiss-Wedge, ed., *History of Goodhue County, Minnesota* (Chicago: H. C. Cooper Jr. & Co, 1909), 529.; Upham, 2001:212.

¹⁷ Stephen H. Long, *The Northern Expeditions of Stephen H. Long: The Journals of 1817 and 1823 and Related Documents*, ed. L. M. Kane, J. D. Holmquist, and C. Gilman (St. Paul: Minnesota Historical Society Press, 1978 [1823]), 79fn2.

¹⁸ Westerman and White, 2012: 52, 129.

¹⁹ Minnesota Historical Society, “Barn Bluff” Interpretive Marker, 1989.

²⁰ Charles Lanman, *A Summer in the Wilderness Embracing a Canoe Voyage Up the Mississippi and Around Lake Superior* (Philadelphia: D. Appleton and Company, 1847), 51.

²¹ Curtiss-Wedge, 1909:37.

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²³ *Ibid.*, 37-39.

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BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

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BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
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CHAPTER 3 . EXISTING CONDITIONS

The present-day appearance of Barn Bluff has been shaped by 19th- and 20th-century activities including the manufacturing of lime, the creation of transportation corridors, and the development of the bluff as a public park. This chapter documents the landscape characteristics and features of Barn Bluff as they appear in 2014 (Figure 41).

SITE DEVELOPMENT OVERVIEW

The City of Red Wing's 43-acre park that encompasses the majority of Barn Bluff was created in 1910. While the conversion of Barn Bluff to a public park had been a topic of discussion amongst the city's citizens for decades prior, the decline of the lime manufacturing industry and a public outcry against further quarrying of stone from the bluff by the Chicago, Milwaukee, St. Paul and Pacific Railroad, led to the park's development.

Historically, those wishing to climb Barn Bluff approached the landmark principally from the west via a trail connection located where Red Wing's Main Street terminated at the foot of the bluff (Figure 30). However, access from the west was cut off by the construction of the existing U.S. Route 63 bridge over the Mississippi River, which was completed in 1960. With the highway bridge and its approach bordering the bluff to the west, the alignment of the U.S. Route 61/63 corridor adjoining the bluff's south side, and the railroad grade and Mississippi River bounding the landform to the north, entry to the property is now only possible from the east. The park's main entrance and a parking area are located along East 5th Street (see Figure 41).

Barn Bluff was listed on the National Register of Historic Places on August 3, 1990. The nomination resulted from the context study "From Palisade Head to Sugar Loaf: An Inventory of Minnesota's Geographic Features of Historic and Cultural Significance."¹ The landform was found to be significant in the areas of Exploration/Settlement and Entertainment/Recreation during the period from 1817 to 1939. The period of significance commences in 1817 with the description of Barn Bluff



FIGURE 30. CITIZEN'S MEMORIAL STAIRWAY

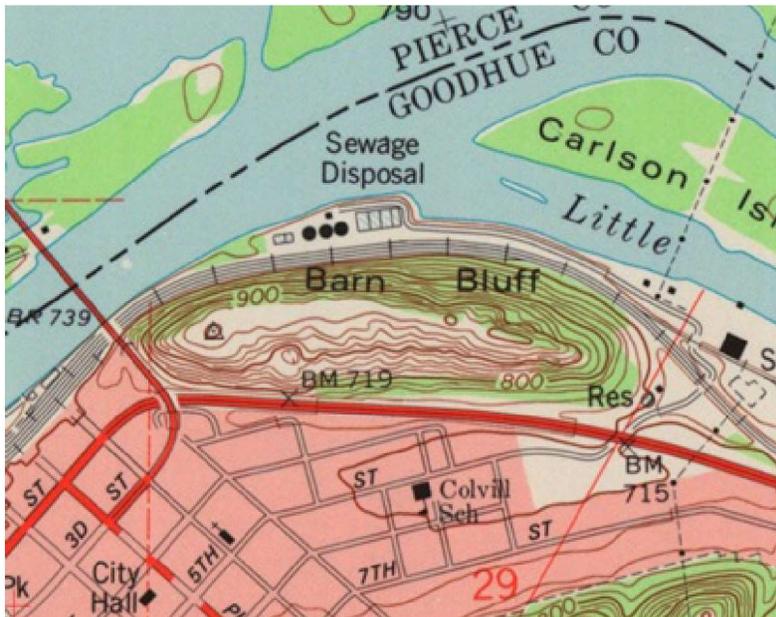
made by explorer Stephen H. Long and his geologist William Keating. The year 1939 was selected for the period's end date to include the publication of the 1938 WPA automobile tour book *Minnesota, a State Guide*.² It also corresponds to the 50 year cut-off when the nomination was written in 1989.

While much of the bluff is encompassed by the boundary of the city's Barn Bluff Park, portions of the landform are also contained within Minnesota Department of Transportation highway right of way. The boundary of the Barn Bluff Historic District includes both city and highway right of way. Due to losses of portions of the bluff to highway construction and railroad development, the historical extent of the bluff is larger than the boundary of either the park or the historic district (see Figure 4).

Since the completion of the highway bridge in 1960, the City of Red Wing and community organizations have worked together to restore and improve public access to Barn Bluff from the east. The East Kiwanis Stairway was completed in 1976, which leads to a plaza and kiosk with information on the site's trail network. In 1982, the Central Kiwanis Stairway was constructed to facilitate the climb to the bluff's summit. In 2014, the Friends of the Bluff organization constructed a new West Overlook.

SPATIAL ORGANIZATION

From the air, Barn Bluff is an elliptical landform oriented nearly due east-west (Figure 31). This orientation, together with the bluff's topography divides the bluff into four faces (denoted by their cardinal directions) and the bluff top, however the bluff has no instituted spatial organization. All four sides of the bluff are steeply-sloped, although the west end, including the northwest and southwest faces, is steeper as a result of portions of the bluff having been blasted away for railroad and highway construction. Upper portions of the landform have exposures of nearly vertical limestone bedrock, which in some areas has been amplified by the quarrying of the stone. The bluff top is a narrow ridge that is nearly level but has a slight pitch towards the south. The north face of Barn Bluff is covered in dense and mature woodlands that wrap around the east end of the landform. The summit of the bluff and the upper portion of the south face is prairie interspersed with stands of sumac, oak savanna, and wooded ravines. The lower portion of the south face is an open woodland largely comprised of secondary growth, while the southwest and west end of the bluff are largely exposed bedrock.



**FIGURE 31. BARN BLUFF ON
1974 USGS TOPOGRAPHIC
MAP**

LAND USE

The current land use of Barn Bluff is recreational. Hiking trails through diverse natural environments traverse the bluff offering wilderness treks leading to commanding views of the City of Red Wing and the Mississippi River valley, while the rock faces of former quarries challenge climbers. Besides the trail network, the principal facilities for park visitors include parking at the foot of the bluff on East 5th Street and a kiosk located at a plaza on the East Kiwanis Stairway (see Figure 41). Benches are provided along the East Stairway, the Central Stairway, and at the newly completed West Overlook. Interpretive markers, plaques, and signage augment the visitor experience.

Secondary uses include utility corridors occupied by overhead power lines that cross the southeast and northeast corners of the bluff, and the presence of a city water reservoir and adjoining pump house at the east end of the bluff. It should also be noted, that a section of vertical rock face overlooking downtown Red Wing is repeatedly defaced with class years and dedications.



FIGURE 32. HIKING BARN BLUFF

CIRCULATION

Circulation on Barn Bluff consists of trails and paths that are both formal and informal in nature (Figure 42). Many trail segments follow the alignment of historic roads, and, in one case, a former rail spur. These roads and the rail line serviced the bluff's historic lime kilns and quarries. The signed trail network allows park users to reach the summit via trails on the north or south side of the bluff and to traverse the top of the bluff between the west and east overlooks. Informal paths have been created by visitors as shortcuts between the established trails, to access rock climbing areas, or to take advantage of particular views. Improvements to the roads and trails have been made over the past century through the cooperation of the City and civic organizations such as the Red Wing Kiwanis Club and Friends of the Bluffs.

The existing Barn Bluff trail network has evolved organically over time. While individual sections, most notably the concrete stairways, were designed with the intent of improving accessibility at particular points on the bluff, no overarching plan has guided trail development. The earliest trails connected the Dakota village and later nascent Red Wing with the bluff top. In 1889 a trail dubbed "Webster's Way" was created from the east of Red Wing's Main Street to the bluff's summit, and later in 1929 was further improved upon with the construction of the Citizen's Memorial Stairway. However, during the 1958-1960 construction of the U.S. Route 63 high bridge, the west connection was lost although a portion of the stairway still remains in use at the northwest corner of the bluff.

Once early visitors had reached the summit of Barn Bluff, they traversed the bluff top via a trail/road leading to the East Overlook. Although its alignment has been altered in parts, the Prairie Trail is the outgrowth of the original bluff-top trail making it the oldest remaining trail segment. At the east end of the bluff, roads that connected the lime kilns and quarries during the 1870s through early 1900s form portions of the North and Midland trails, while the alignment of the railroad spur for G. A. Carlson's lime operations provides the route of the Carlson Kiln Trail. Other portions of the designated trail network came about more informally, such as the west half of the North Trail, which was created by those seeking a connection between the West Overlook and the west end of the North Quarry.

The South Trail, the East Kiwanis Stairway (1976), the Central Kiwanis Stairway (1982), and their associated elements were developed to restore and improve public access to Barn Bluff from the east in the years following the construction of the U.S. Route 63 high bridge. The East Kiwanis Stairway incorporates 143 of the original steps from the 1929 stairway. In 1982, the Central Kiwanis Stairway was constructed to alleviate one of the steepest portions of the trail leading to the bluff top. While the stairway was a new construction, it evoked the original stairway by stamping the names of the project's supporters into the steps. Sixty original steps from the 1929 stairway form benches at landings on the 1982 stairway and around a plaza the top of the stairway. In total, the three stairways on the bluff preserve 323 (68%) of the original 472 concrete steps that were present in the 1929 stairway.



FIGURE 33. PRAIRIE TRAIL SEGMENT

Augmenting the trail network are a variety of informal paths. These paths are created by bluff visitors seeking connections between designated trails or more direct routes to points of interest like the climbing walls within the former quarries. Based on an examination of aerial photographs, some of these routes have been used for decades, while others are of a more temporary nature.

While the trail network encompasses portions of historic roads and paths, others that existed during the period of significance are still present on the bluff, but are not as distinct. For example at the east end of the bluff, a segment of a roadway used during the period of lime manufacturing is overgrown, but still discernible. Likewise a trail evident on the 1938 aerial photograph along the north edge of the bluff top can still be traced.

VEGETATION

Barn Bluff has four principal habitat types (prairie, oak savanna, oak grove, and deciduous forest), which have been divided into seven management areas (Figure 34). Within Barn Bluff Park, 23 acres are covered by bluff prairie and oak savanna interspersed with rock outcrops, while the remainder is deciduous forest. Historical accounts and images indicate that these vegetation communities were historically present on the bluff, although their boundaries have changed over time, and invasive plant species have been introduced. When park development was being considered in the 1870s there was discussion of planting shade trees, but these efforts did not meet with success.³ An attempt to create a coniferous forest on Barn Bluff was averted when arson destroyed 10,000 evergreens in 1963.⁴ Occasional landscape plants, such as lilac bushes and swaths of daylilies, are also present in the southeast quadrant of the bluff where houses were once located along East 3rd Street.



FIGURE 34. VEGETATION COMMUNITIES PRESENT ON BARN BLUFF
(CONNOLLY 2014, U.S. FISH AND WILDLIFE SERVICE)

The Partners for Fish and Wildlife Program of the U.S. Fish and Wildlife Service has prepared a long range habitat management plan for Barn Bluff with the goal of maintaining and restoring the native open habitats (prairie and oak savanna), and controlling exotic and invasive species such as buckthorn, honeysuckle, sumac, and quaking aspen (Appendix D).⁵ Beginning in 2014, prescribed burns are being implemented within the native prairie and oak savanna atop the bluff in order to reduce invasive species and stimulate existing native plants. Controlled burns are being performed through the cooperation of the City of Red Wing, the Minnesota Department of Natural Resources and the Conservation Corps of Minnesota.⁶

STRUCTURES

NATIVE AMERICAN EARTHWORKS/MOUNDS

The oldest human constructions on Barn Bluff are three circular earthworks/burial mounds located on the west half of the bluff top. The largest, and most visible mound has a recorded height of 6.5 feet and a diameter of 52 feet.⁷ It is not known when these features were initially constructed or when they were last used, but burial mounds and earthworks are most often associated with the Woodland through Mississippian periods (1000 B.C.-A.D. 1750). Archaeological evidence indicates that the fertile Mississippi River valley around Red Wing was intensively occupied by Native Americans between A.D. 900-1300, and it is likely that the mounds atop Barn Bluff, and the more than 2,000 others in the vicinity, date to this era.⁸ Further detail on the Barn Bluff mound group is provided in the discussion of Archaeological Resources in Chapter 4.



**FIGURE 35. NATIVE AMERICAN MOUND ATOP
BARN BLUFF**

LIME KILNS

The largest standing structure on Barn Bluff is the National Register-listed G. A. Carlson Lime Kiln located at the foot of the bluff's northeast slope (Figure 36). Constructed in 1882, the kiln, together with the stone quarries on the bluff, bear testament to the significant role of the lime manufacturing industry in the history of Red Wing and the shaping of the current appearance of the bluff. Carlson's Red Wing Pioneer Lime Works, which encompasses not only the 1882 kiln, but also his nearby Tunnel Kiln, the foundations of associated structures, and the roads and rail spur that serviced the industry, are encompassed within the boundary of a single archaeological site (21GD297) discussed in more detail in the Archaeological Resources section of Chapter 4. The quarries of G. A. Carlson's lime works located at the east end of Barn Bluff are also encompassed within the boundary of archaeological site 21GD297. To their immediate west along the north face of the bluff is the former quarry of Twin City Lime and Cement Company which operated kilns at the foot of the north slope. A third quarry, that of F. J. Linne, is located on the southwest side of the bluff.



FIGURE 36. G.A. CARLSON'S 1882 KILN

***CITY WATER DEPARTMENT No. 2
PUMP HOUSE AND RESERVOIR***

Located at the foot of the east slope of Barn Bluff is the City Water Department's Pump House No. 2 (GD-RWC-1378), which consists of a c. 1920 control building and reservoir. The control building house is a one-story, brick structure. The poured concrete reservoir is partially constructed into the bluff and is surrounded by a buttressed concrete retaining wall. The pump house and reservoir have been recommended as potentially eligible for inclusion in the National Register of Historic Places.



FIGURE 37. PUMP HOUSE AND RESERVOIR

KIOSK/SHELTER

A plaza on the East Kiwanis Stairway is the site of a small, hip-roofed, timber-framed kiosk/shelter that provides information on the park's trail network. The kiosk was built in 2003 with the assistance of a Certified Local Government (CLG) grant. Four benches, including one within the kiosk/shelter, are also present. The benches appear to date to the 1975/1976 construction of the stairway.



FIGURE 38. KIOSK/SHELTER

WEST OVERLOOK

After the West Kiwanis Stairway and the west end Barn Bluff were altered by the construction of the highway bridge, the remaining uppermost landing of the stairway became a West Overlook. In 2014, the Friends of the Bluff, with the support of Red Wing Shoes, and in cooperation with the City constructed a new West Overlook. This feature, which was constructed of limestone, was sited adjacent to, but not abutting the original stairway concrete landing (Figure 39). The new overlook incorporates pipe railing like that used on the stairways and missing railing was restored on the 1929 landing.



**FIGURE 39. WEST OVERLOOK
(FRIENDS OF THE BLUFFS)**

SMALL-SCALE FEATURES

The primary small-scale features on Barn Bluff include flagpoles, limestone walls, and interpretive/information signage.

FLAGPOLES

In 1929, in conjunction with the completion of the West Kiwanis Stairway, a flagpole base was erected atop Barn Bluff's west end where it was visible from downtown Red Wing. The footing for the flagpole's concrete base, which was installed by the Red Wing America Legion (Post 54), was placed within the largest Native American earthwork atop the bluff. While no longer supporting a flagpole, the base remains. A National Geodetic Survey marker, also excavated into the top of the mound, is nearby. In 2011, American Legion Post 54 constructed a new flagpole atop the bluff slightly downslope and to the southwest of the earlier flagpole.

REMNANT WALLS

Several sections of limestone wall are present on Barn Bluff. These are found principally on the east half of the bluff. Some are retaining walls supporting sections of roads or terraces associated with the lime manufacturing industry. Others are remnants of terraces and landscaping elements associated with the homes that were formerly located along East 3rd Street. A cistern is also present within the former East 3rd Street neighborhood.

INTERPRETIVE/INFORMATION SIGNAGE

Interpretive markers consist of three plaque and boulder monuments (Mt. La Grange – Barn Bluff; Kiwanis Stairway [East]; and Kiwanis Stairway [West]), a standard cast, post-mounted Minnesota historical marker (Barn Bluff), and a plaque set in a monument built of cut limestone (G.A. Carlson Lime Kiln). Most of these monuments were created during the 1970s and 1980s. The Carlson Lime Kiln monument was built in 2003.

The City has constructed a park entrance sign near the foot of the East Kiwanis Stairway and has installed wayfinding and interpretive signs along the trails throughout the park.



FIGURE 40. CITY PARK SIGN

Endnotes

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⁵ Tim Connolly, *Habitat Management Plan for City of Red Wing Parks: Barn Bluff*. Draft. (Winona, Minnesota: U.S. Fish and Wildlife Service, Upper Mississippi National Wildlife and Fish Refuge – Winona District, 2014).

⁶ Danielle Killey, "Burning for a Better Bluff," *Red Wing Republican Eagle*, November 6, 2014.

⁷ Newton H. Winchell, *The Aborigines of Minnesota*, (St. Paul: Minnesota Historical Society, 1911), 164.

⁸ Fleming 2009: 6, 11, 15, 71-72; Institute for Minnesota Archaeology 1999

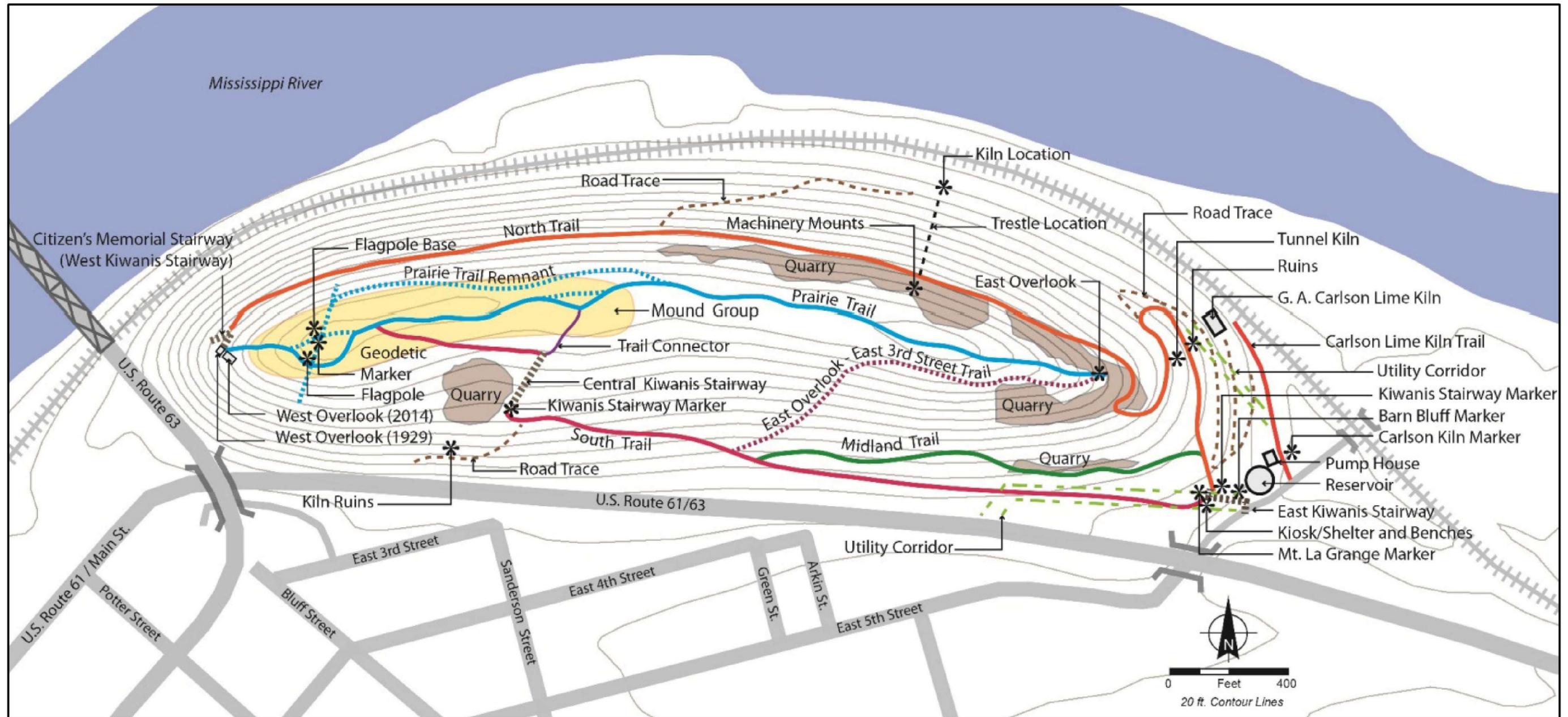


FIGURE 41. BARN BLUFF - EXISTING CONDITIONS PLAN

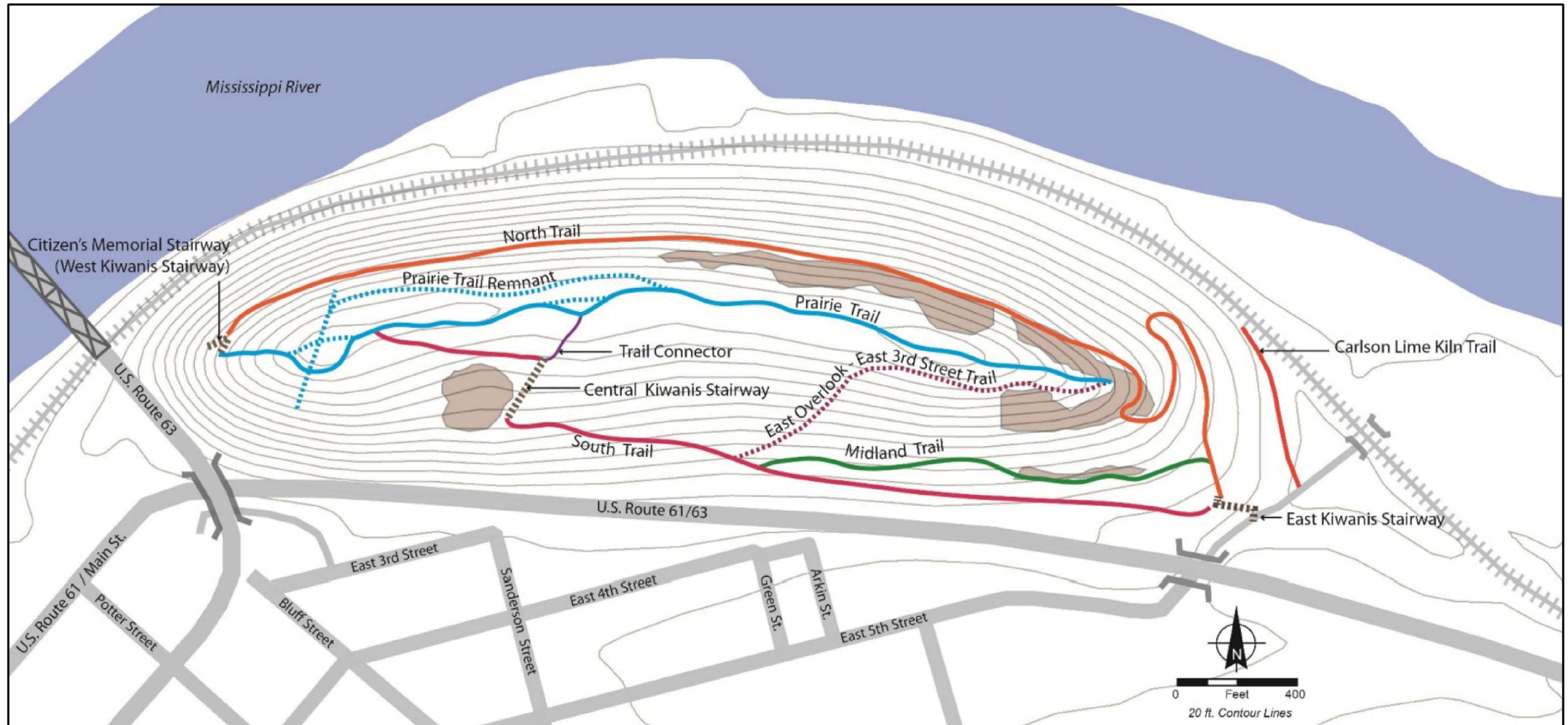


FIGURE 42. BARN BLUFF - EXISTING CIRCULATION PLAN

CHAPTER 4 . ANALYSIS AND EVALUATION

The historical significance of Barn Bluff was formally recognized in 1990 with its listing in the National Register of Historic Places. This chapter reviews the property's National Register status, identifies any contradictions or short-comings in the current listing, and makes recommendations for revisions in accordance with National Register criteria and guidelines. The evaluation portion of the chapter describes the physical integrity of the property's existing landscape features (structures, circulation, and vegetation) with reference to their historic context(s), and identifies which features contribute or do not contribute to the historical significance of Barn Bluff.

EVALUATION OF HISTORICAL SIGNIFICANCE

In order for a property to be listed in the National Register of Historic Places it must undergo a defined process of identification and evaluation. Through this review it must demonstrate that it meets one of the following standards for historical significance.

Criterion A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

Criterion B. That are associated with the lives of persons significant in our past; or

Criterion C. That embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

Criterion D. That have yielded, or may be likely to yield, information important in prehistory or history.

CURRENT NATIONAL REGISTER STATUS

The nomination of Barn Bluff to the National Register of Historic Places resulted from the context study "From Palisade Head to Sugar Loaf: An Inventory of Minnesota's Geographic Features of Historic and Cultural Significance."¹ This study created a statewide inventory of significant geographic features and created guidelines for their evaluation and registration. Barn Bluff/La Grange, together with four additional features, was selected to illustrate the application of the context.

Barn Bluff was identified as a natural feature of local significance under National Register Criterion A in the areas of areas of Exploration/Settlement and Entertainment/Recreation. The selected period of significance for the property is 1817 to 1939. The statement of significance from the National Register nomination reads:

Barn Bluff is one of the best-known natural features along the Mississippi River for its association with the exploration of the Upper Mississippi in the nineteenth century, and for its association with mid-nineteenth through early twentieth-century travel, tourism, and recreation. A many-

layered interpretation of the feature is evident in local legend, as well as in published historical and scientific accounts, works of art, and photography.

The Barn Bluff National Register Historic District consists of one contributing site (bluff landform) and one contributing structure (concrete staircase). Three structures (earthworks/mounds) and three objects (interpretive signs) within the boundary of the historic district are described as not contributing to its historical significance.²

SUMMARY OF SIGNIFICANCE FOR THE 1817-1939 PERIOD

The year 1817 corresponds with the first detailed description of Barn Bluff made by explorer Stephen H. Long and his geologist William Keating. The year 1939 was selected for the period's end date to include the publication of the 1938 WPA automobile tour book *Minnesota, a State Guide*.³ It also corresponds to the 50 year cut-off when the nomination was written in 1989.

Barn Bluff's defined historical period of significance encompasses the substantive descriptions of the bluff from the exploration period; its appreciation by 19th-century nature tourists, artists, and writers documenting the aesthetics and scenery of the American west; early 20th-century community efforts to preserve the bluff; and its development as a park and continued tourist destination. The history of Barn Bluff illustrates the development of the American conservation movement (1850-1920),⁴ and its period of significance reflects that connection.

POTENTIAL EXPANSION OF AREAS OF SIGNIFICANCE

As presently written, the National Register of Historic Places listing for Barn Bluff does not recognize the extensive industrial use of the bluff from c.1865-1908 as contributing to the landform's historical significance. However, the stone quarrying and lime manufacturing industries have had a significant impact on the present landscape of Barn Bluff and the existing park's formation resulted from a public preservation movement in direct response to the continued removal of stone from the bluff. Furthermore, the park encompasses several historically-significant features related to the stone and lime industries including, most notably, the G. A. Carlson Lime Kiln. The Carlson kiln is individually listed on the National Register, but the greater industrial complex of which it was a part covers much of the east end of the bluff. The recently-identified archaeological site that encompasses those features (21GD297) is recommended as eligible for listing in the National Register of Historic Places under Criteria A and D. The other quarries and kiln remains on the bluff related to the operations of F. J. Linne and the Twin City Lime and Cement Company have not yet been evaluated. Historical features related to the stone and lime industries are integrated into the bluff's current recreational use (e.g., trails following quarry roads, and rock-climbing in abandoned quarries).

In order to facilitate the long-term management of Barn Bluff's cultural resources, it is recommended that the areas of significance for the Barn Bluff Historic District be expanded to include, under Criteria A and D, the stone quarrying and lime manufacturing industries (and contributing resources), the history of which is integral to the formation and preservation of Barn Bluff's present cultural landscape.

NATIONAL REGISTER LISTING BOUNDARY DESCRIPTION

Per the National Register nomination form for Barn Bluff, the boundary of the nominated property is delineated by the 740-foot contour line on the United States Geological Survey 7.5-minute quadrangle map (Red Wing, Minn.-Wis., 1974). The boundary was described as including “the entire parcel that has historically been associated with the property.” The acreage contained within the boundary was estimated at 108 acres, although it is closer to 50 acres in size.

POTENTIAL REFINEMENT OF THE NATIONAL REGISTER LISTING BOUNDARY

The boundary of the National Register property based on the 740-foot contour line on the 1974 USGS map does not correspond to parcel boundaries or visible landmarks, which makes it difficult to readily determine if a given landscape element or cultural feature is located within the boundary of the district. In order to facilitate long-term resource management, the following revised boundaries are recommended (Figure 43).

- North – South boundary of the right of Way of the Canadian Pacific Railway
- East – Alignment of East 5th Street; North edge of the Carlson Trail (rail spur)
- South – Alignment of TH 61/63 (top of backslope of disturbed ditch)
- West – East boundary of TH 63 Highway ROW

This boundary (which is the same as the study area for this report) would include five city-owned parcels (55.020.0030; 55.020.0060; 55.020.0100; 55.020.0130; 55.610.0080), and Minnesota Department of Transportation right of way. All remaining portions of Barn Bluff are encompassed within this boundary and land ownership remains unchanged.

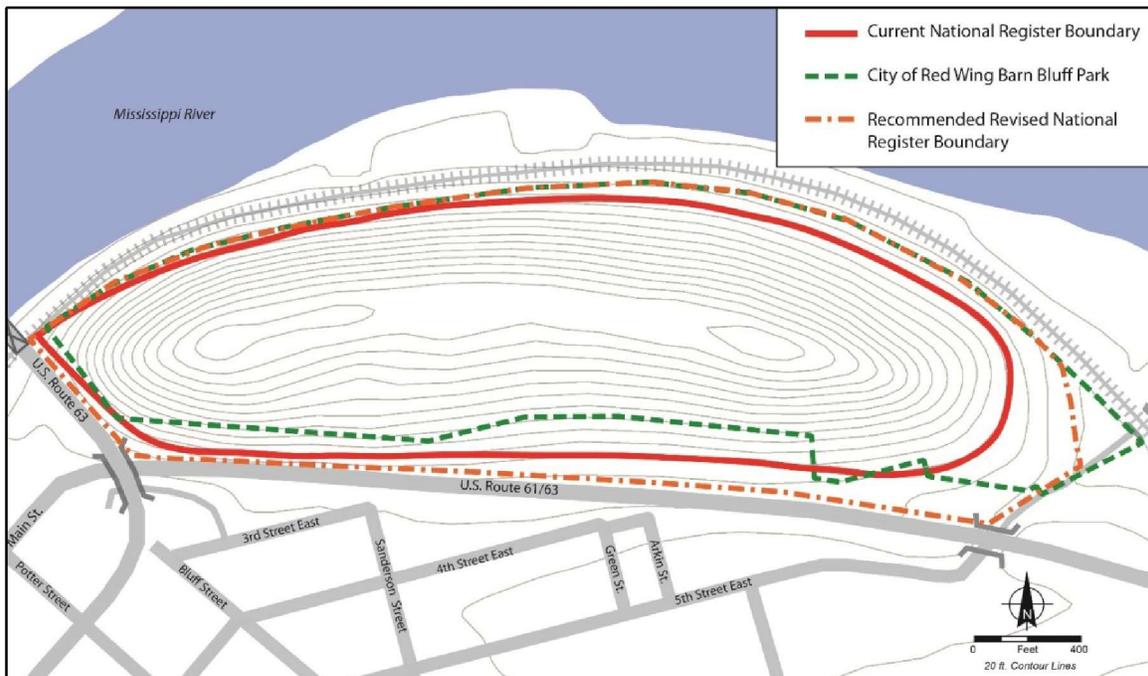


FIGURE 43. EXISTING AND PROPOSED NATIONAL REGISTER LISTING BOUNDARIES

EVALUATION OF LANDSCAPE INTEGRITY

A National Register property must not only be historically significant, but it must also retain sufficient integrity to continue to communicate its significance. “The integrity of a cultural landscape is determined by the degree to which the landscape characteristics that define its historical significance are still present. Because some landscape characteristics (such as vegetation and use) are dynamic, integrity also depends on the extent to which the general character of the historic period is evident and the degree to which incompatible elements are reversible. It is important to consider how such changes affect the landscape as a whole and the degree to which they impact or obscure the landscape’s character and integrity. With some vernacular and ethnographic landscapes, change itself is a significant factor and must be considered in assessing integrity.”⁵

The National Register guidelines identify seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. To retain sufficient integrity to convey a sense of the past, a property will always possess several, and usually most, of the seven aspects (not all are applicable to every property type).

- Location is the place where the historic property was constructed or the place where the historic event occurred
- Design is the combination of elements that create the form, plan, space, structure, and style of a property.
- Setting is the physical environment of a historic property
- Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- Feeling is a property’s expression of the aesthetic or historic sense of a particular period of time.
- Association is the direct link between an important historic event or person and a historic property.

With regard to its appearance as a distinct and recognizable landform, as a whole, Barn Bluff retains the same level of integrity that it demonstrated at the time of its listing in the National Register. The relationship of Barn Bluff to the Mississippi River and the City of Red Wing remains unchanged and the natural forces that led to its creation at this point in the river can still be visualized. Vegetation patterns, trails, and features from the bluff’s period of significance are retained. Its association with events that have made a significant contribution to the broad patterns of our history including exploration of the Upper Mississippi during the 19th century and for its association with mid-19th through early 20th-century travel, tourism, and recreation remains. While portions of the bluff have been removed, as noted in the National Register nomination, “The integrity of the feature, however, is not greatly diminished by these cuts or by the highway bridge at Barn Bluff’s northern tip.”⁶ Recent additions to the park, including the 2011 flagpole and 2014 West Overlook, do not detract significantly from the overall integrity of the landform.

ANALYSIS OF LANDSCAPE CHARACTERISTICS AND FEATURES

This report section provides descriptions of the individual landscape elements present on Barn Bluff that define its character and aid in understanding its cultural value. The intent of this section is to provide a list of characteristic features that contribute to the historical significance of the greater landform. Features that do not contribute to the significance of the property are also documented. Landscape characteristics described in this section of the report include:

- Topography
- Natural Systems and Features
- Views and Vistas
- Spatial Organization
- Land Use
- Circulation
- Vegetation
- Structures
- Small-Scale Features
- Archaeological Resources

TOPOGRAPHY

Topography is the three-dimensional configuration of the landscape surface, its characteristic features, and orientation.⁷

Historic Condition

Barn Bluff is defined by its distinctive topography. An outlier bluff carved by the ancestral Mississippi River, the combined topographic qualities that made Barn Bluff a significant landmark are its insulated nature, towering height, mesa-like appearance, and level bluff top that afforded dramatic views up and down the river due to its east-west orientation and situation within the river valley (Figure 44).

Existing Condition

Overall, the topography of Barn Bluff remains unchanged. While portions have been modified by quarrying as well as railroad and highway construction, these alterations have not diminished the overall integrity of the bluff's form or the salient aspects of its topography mentioned above.

Evaluation: Contributing

Barn Bluff's historical significance is inherently linked to its topography and the landform continues to reflect the character-defining elements that were evident during the historic period (1817-1939).

NATURAL SYSTEMS AND FEATURES

Natural systems and features are those natural processes or resulting features that have influenced the development and physical form of a landscape.⁸

Geology and Geomorphology

Historic Condition

Barn Bluff's present form is a direct result of the geological forces that created its bedrock underlayment and the interaction of those strata with subsequent geomorphological processes. See the "Natural History" section of Chapter 2 for additional information on these aspects of Barn Bluff.

Existing Condition

Bedrock exposures and the topography of the bluff bear testimony to its geological history and the natural forces that led to its creation at this point in the river can still be visualized.

Evaluation: Contributing

Barn Bluff's underlying geology and the geomorphological processes that resulted in the landform's distinct topography are significant characteristics of the landform.



FIGURE 44. OVERVIEW OF BARN BLUFF AND RED WING, 1875
(MINNESOTA HISTORICAL SOCIETY)

East Overlook

Historic Condition

The East Overlook is a natural projection of limestone ledges at the east end of Barn Bluff. Prior to quarrying on Barn Bluff, the east end of the bluff featured a rounded bluff top with projecting limestone ledges (Figure 45). Subsequent intensive quarrying of the Oneota limestone on both the north and south sides of the bluff created a prow-shaped point at the east end of the bluff (see Figure 21). Local histories indicate that from the bluff top, and likely this east overlook, Red Wing's citizens watched for the first steamboats to arrive in the spring. The views from the East Overlook are also featured in many historic images.

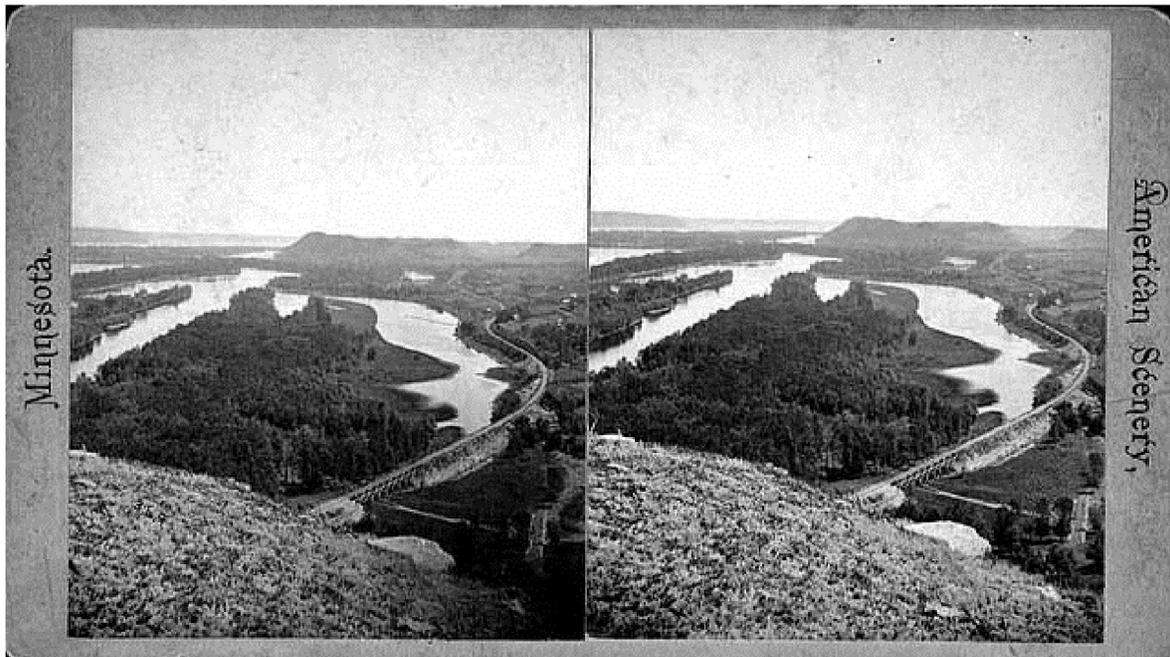


FIGURE 45. VIEW FROM THE EAST OVERLOOK, c. 1880
(MINNESOTA HISTORICAL SOCIETY)

Existing Condition

The East Overlook, which is located at the east terminus of the Prairie Trail, is formed of terraces of exposed limestone. The overlook offers views of the expansive Mississippi River valley with Colvill Bay in the foreground and Lake Pepin in the distance (Figure 46). While the Prairie Trail approach is eroded (Figure 47), the integrity of the East Overlook is good.

Evaluation: Contributing

The East Overlook is a character-defining natural feature of the Barn Bluff Historic District that dates to the bluff's historic period and is fundamentally associated with visits to the bluff during the exploration period and its subsequent recreational use.



FIGURE 46. VIEW TOWARDS LAKE PEPIN FROM THE EAST OVERLOOK, 2014



FIGURE 47. CONDITION OF EAST OVERLOOK, VIEW TO THE WEST

“Indian Head” and Natural West Overlook

Historic Condition

The “Indian Head” was a natural rock formation within an exposure of limestone bedrock at the west end of Barn Bluff (Figure 48). The ledges of this limestone prominence also formed a natural overlook (Figure 49). A sheltered ledge below the outcrop is likely the spot referred to in a 1909 history of Goodhue County as “the ledge on Barn Bluff, which now provides so excellent a spot for picnic parties.”⁹

Existing Condition

The 1958-1960 construction of the U.S. Route 63 high bridge required the removal of portions of the west face of Barn Bluff including rock face and ledge that formed the natural west overlook and the “Indian Head.”

Evaluation: Destroyed

While a vertical rock face remains at this corner of the bluff, the projecting rock ledge and “Indian Head” have been destroyed.

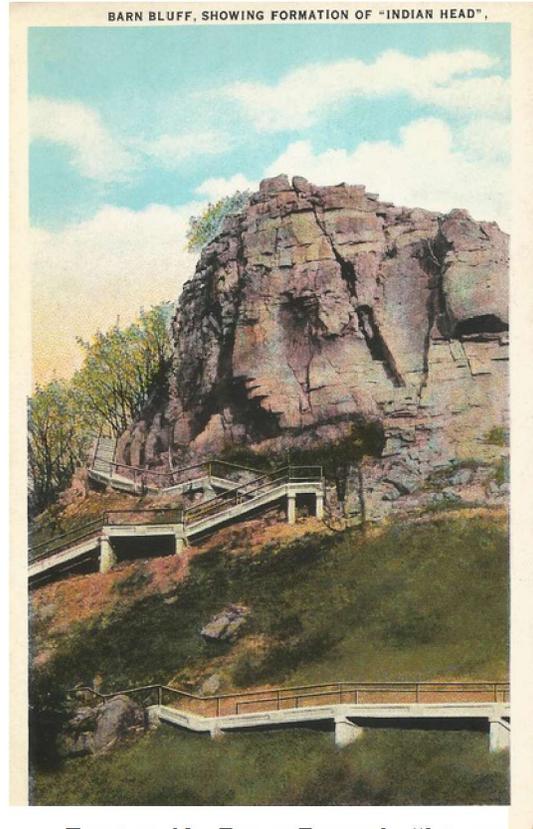


FIGURE 48. BARN BLUFF’S “INDIAN HEAD” ROCK FORMATION



FIGURE 49. VIEW TO THE NORTHWEST FROM THE FORMER NATURAL WEST OVERLOOK

VIEWS

Views are landscape characteristics that offer expansive or broad ranges of vision.¹⁰ They may occur naturally or be deliberately designed and controlled. Barn Bluff, by virtue of being an isolated prominence offers unlimited views of the surrounding landscape, but there are two views from the bluff described below that are repeatedly referenced in historical descriptions and images.

Mississippi River and Lake Pepin – East Overlook

Historic Condition

As previously described, the East Overlook offers an expansive view of the Mississippi River valley with Colvill Bay in the foreground and Lake Pepin in the distance (Figure 50). Of this view in 1820, Henry Schoolcraft wrote, “Turning the eye towards the east, Lake Pepin spreads its ample sheet across the entire valley of the river, from bluff to bluff, and the indentures of its shores recede one behind another, until they become too faint to be distinguished, and are terminated on the line of the horizon.”¹¹ This view is repeatedly featured in art and photographs from the period of significance.



Lake Pepin from Barn Bluff

Existing Condition

The view downriver from Barn Bluff to Lake Pepin remains as impressive today as it was when Henry Schoolcraft described it nearly 200 years ago. While the backwater below the bluff has been filled, and the Xcel Energy generating plant now occupies the visual foreground, the height of the bluff is such that the plant's stacks do not interrupt the view to Lake Pepin. The islands in the river and the distant bluffs are readily matched to historic images (see Figure 50).



FIGURE 50. VIEW TOWARDS LAKE PEPIN FROM THE EAST OVERLOOK (TOP C. 1870, BOTTOM 2014)

(TOP: MINNESOTA HISTORICAL SOCIETY)

Evaluation - Contributing

The view downriver to Lake Pepin from the east end of Barn Bluff contributes to the historic significance of the Barn Bluff Historic District as a character-defining view of the historic period (1817-1939).

View of Downtown Red Wing and Mississippi River Valley – West Overlook

Historic Condition

The view from the west end of Barn Bluff offers an expansive view of downtown Red Wing and the Mississippi River valley beyond. Of this view in 1820, Henry Schoolcraft wrote, “The immense valley of the Mississippi, with the numerous channels and islands of the river--the prairies and forests--with the windings of a number of small rivers which flow into the Mississippi, spread like a map below the eye. The calcareous bluffs which bound this valley, and terminate the prospect towards the west, in a line of lofty grey cliffs, throw an air of grandeur upon the scene, which affords a pleasing contrast with the deep green of the level prairies, and the silvery brightness of the winding river.”¹² Like the view towards Lake Pepin, this view upriver over downtown Red Wing is repeatedly featured in art and photographs from the period of significance (Figure 51).

Existing Condition

Due to development, the view overlooking Red Wing and upriver from the west end of Barn Bluff is not as pristine as the view downriver. However, the orientation of the streets below, many buildings within the downtown historic district, the bend in the river and the bluffs surrounding the expansive river valley remain recognizable (see Figure 51).

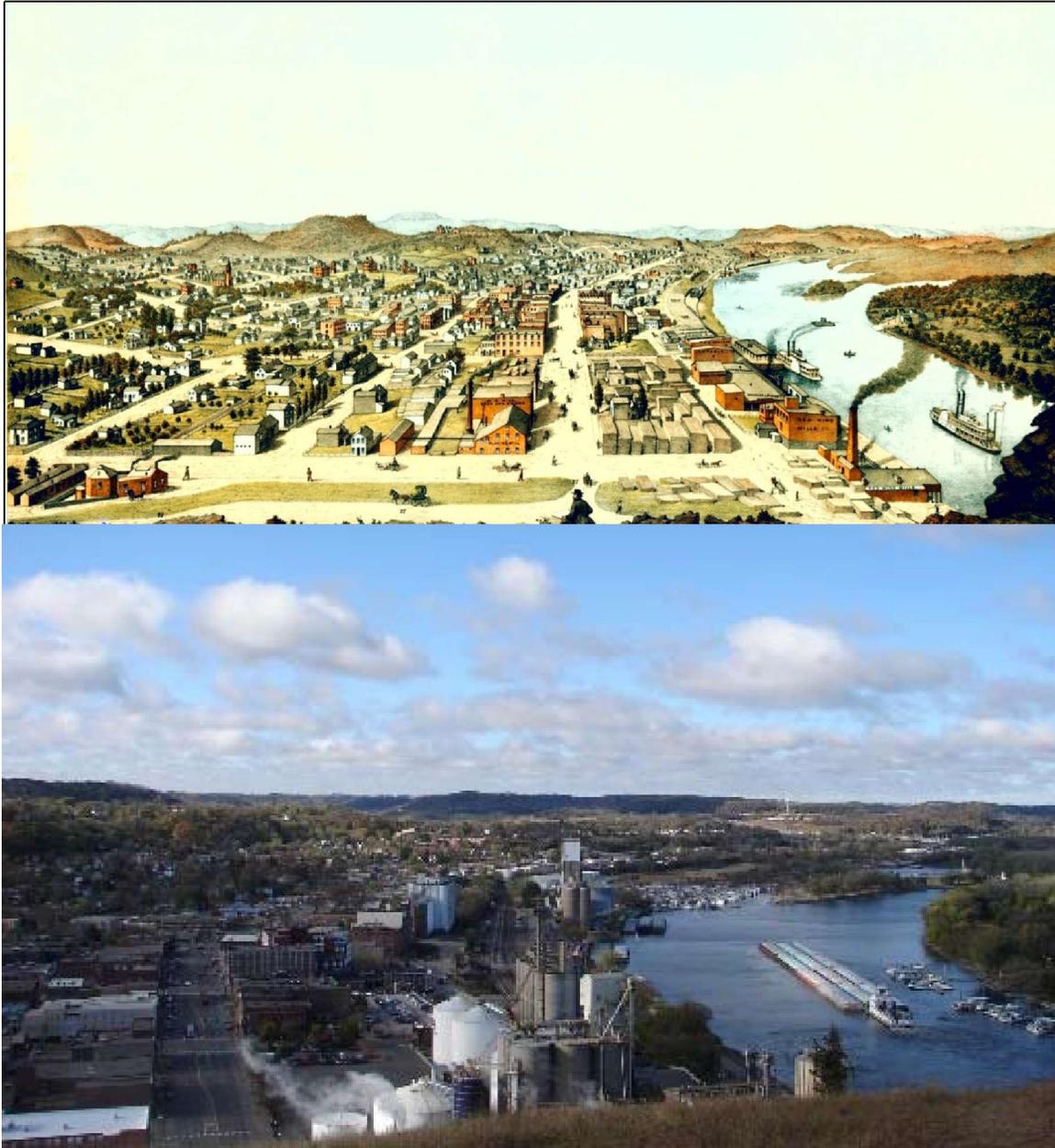
Evaluation - Contributing

The view from the west end of Barn Bluff contributes to the historic significance of the Barn Bluff Historic District as a character-defining view of the historic period (1817-1939). The opportunity to take in this impressive view continues to draw visitors to the top of Barn Bluff.

Other Views

As noted at the outset of this section, Barn Bluff has an expansive viewshed and offers unlimited views. Two worn trails at the west end of the bluff travelling north and south from the vicinity of the 1929 flagpole base, and which are evident on the 1938 aerial photograph of the bluff, suggest that visitors perhaps value the views offered by these points on the bluff as well, but they are not documented in historical descriptions and images (see Figures 41, 42, and 124).

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT



**FIGURE 51. VIEW OF DOWNTOWN RED WING AND THE MISSISSIPPI RIVER FROM
BARN BLUFF (TOP C. 1870, BOTTOM 2011)**

(TOP: CAMPBELL 1874)

SPATIAL ORGANIZATION

Spatial organization is the three-dimensional arrangement of cultural and natural features that define and create spaces in the landscape.¹³

Historic Condition

The spatial organization of Barn Bluff has been historically determined by the topography of the landform, which divides the bluff into four faces (denoted by their cardinal directions) and the bluff's top. All four sides of the bluff are steeply-sloped, although the north face has a particularly steep and steady incline (40 to 80%) from summit to base causing Stephen Long to write of the bluff in 1817 that "Its acclivity on the river side is precipitous, that on the opposit [sic] very abrupt."¹⁴

The steep side slopes of the bluff coupled with the nearly vertical exposures of limestone encircling the east and west ends of the bluff limited land use and circulation patterns on the bluff. As the stone quarrying and lime manufacturing industry developed during the late 19th century, the creation of quarries, the building of kilns, and the construction of roads linking the two were quite literally carved into the slopes of the bluff. Only the nearly level bluff top covered in open prairie leant itself readily to the construction of precontact Native American earthworks and the development of a trail connecting the natural east and west overlooks offered by the prominence (Figure 124).

Existing Condition

The spatial divisions created by Barn Bluff's topography remain unchanged today and are further highlighted by the present trail system (North Trail, South Trail, Prairie Trail, Midland Trail) (see Figures 41 and 42). While the quarrying of stone from the bluff altered portions of the landform, and the northwest and southwest faces have been made steeper as the result of portions of the bluff being removed for railroad and highway construction, the overall form and spatial organization of the bluff retains its integrity.

Evaluation: Contributing

The spatial organization of Barn Bluff is the result of its formation and hence related to its significance as a geographic landmark. The characteristics of the landform that create landscape patterns and spaces existed during the period of significance and hence contribute to its historic character.

LAND USE

Land use is the principal activities that have formed, shaped, or organized the landscape.¹⁵

Historic Condition

During the identified period of historical significance (1817-1939), the majority of Barn Bluff has remained a natural landform principally utilized for tourism/recreational purposes with the exception of periods of industrial and residential land use. Native American land uses (mortuary, habitation, and defensive) of Barn Bluff and its incorporation into the greater ethnographic landscape of the Red Wing locality are also acknowledged, but largely predate the identified period of significance. However, Native American trail connections to the bluff top were the foundation of the recreational trail system that developed on the bluff. Industrial land use areas consist of three limestone quarries, four lime kiln locations, and the roads, rail spurs, and ancillary features related to the operation of these industries. Residential use was limited to the base of the south slope of Barn Bluff along East 3rd Street (Figure 124).

Existing Condition

Barn Bluff is a city park that allows for low-impact recreational use within a natural landscape. Secondary uses include utility corridors occupied by overhead power lines that cross the southeast and northeast corners of the bluff, and the presence of a city water reservoir and adjoining pump house at the east end of the bluff.

Evaluation

Natural resource areas account for the majority of Barn Bluff's current land use. The north face of the bluff is covered by a mature maple-basswood forest, while the bluff top and most of the south face consists of open prairie interspersed with oak savanna and groves. The east base of the bluff is encompassed by a mixed deciduous forest. Limestone outcrops and vertical exposures are evident particularly on the east and west ends of the bluff. Historical accounts and images indicate that these vegetation communities were historically present on the bluff, although their boundaries have changed over time, and invasive plant species have been introduced. These natural resource areas contribute to the historical character of Barn Bluff.

Tourism and recreation is the primary current use of Barn Bluff. A trail network, including three stairways, and an information kiosk are the principal landscape elements associated with this use. Some of these features date to the bluff's period of significance and contribute to its historical significance, while others are contemporary outgrowths of this historic use and compatible with Barn Bluff's historic character.

Industrial activity on Barn Bluff ceased when quarrying was halted in 1908. While no longer in use, quarries, lime kiln ruins, roads, and other features occupy portions of the landscape. While the industrial use of the bluff occurred within the period of significance (1817-1939) of the Barn Bluff Historic District, the stone quarrying and lime manufacturing industries are not recognized within the district's currently defined areas of significance (Exploration/Settlement and Entertainment/Recreation). However, the stone quarrying and lime manufacturing industries have had a significant impact on the present landscape of Barn Bluff and the park encompasses several historically-significant features related to the stone and lime industries including, most notably, the

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

National Register-listed G. A. Carlson Lime Kiln. While non-contributing to the Barn Bluff Historic District as currently defined, the industrial features do not diminish the property's historic character. It is recommended that the areas of significance in the National Register listing be expanded to include the stone quarrying and lime manufacturing industries, the history of which is integral to the formation and preservation of Barn Bluff's present cultural landscape.

Residential land use is no longer present on Barn Bluff. The late 19th and early 20th century residential neighborhood formerly located at the base of the bluff along East 3rd Street was removed during highway construction in the late 1950s. Demolition and grading was intensive, however remnant road traces, retaining walls, a cistern, and domestic vegetation indicate this former land use. Residential land use is not compatible with the historic areas of significance (Exploration/Settlement and Entertainment/Recreation) and therefore the loss of this neighborhood does not impact the historic character of the landform.

Public utilities, including overhead power lines and the city's water reservoir and adjoining pump house are located on the east end of the bluff but outside the current Barn Bluff Historic District boundary. While these features date to the period of significance, this land use is not compatible with the historic areas of significance (Exploration/Settlement and Entertainment/Recreation) and should the district's boundary be expanded to encompass these features, they would not be considered contributing to the significance of the Barn Bluff Historic District.



FIGURE 52. AERIAL VIEW OF BARN BLUFF, 1960, VIEW TO EAST
(MINNESOTA HISTORICAL SOCIETY)

CIRCULATION

Circulation is the system of movement in a landscape and the spaces, features, and materials of which it is comprised.¹⁶ Circulation on Barn Bluff consists of trails and paths that are both formal and informal in nature. Many trail segments follow the alignment of historic roads, and, in one case, a former rail spur. Circulation is further facilitated by three concrete stairways installed in 1929, 1976, and 1982 (see Figures 42 and 124).

Citizen's Memorial Stairway (West Kiwanis Stairway and West Overlook)

Historic Condition

The West Kiwanis Stairway and West Overlook are the only remaining original, in-place portions of the Citizen's Memorial Stairway which was completed in August of 1929 (Figures 53). The elevated concrete stairway began at the east end of Main Street and from that point it snaked its way up the west face of Barn Bluff. It took 472 steps, eight large platforms, and 12 small platforms to reach the summit of the bluff. Each step of the stairway was impressed with the name of donors that supported the project. The majority of the stairway was removed in the late 1950s to make way for the construction of the U.S. Route 63 high bridge completed in 1960. Those steps that could be salvaged were saved and eventually incorporated into the 1975-76 and 1982 Kiwanis Stairways.

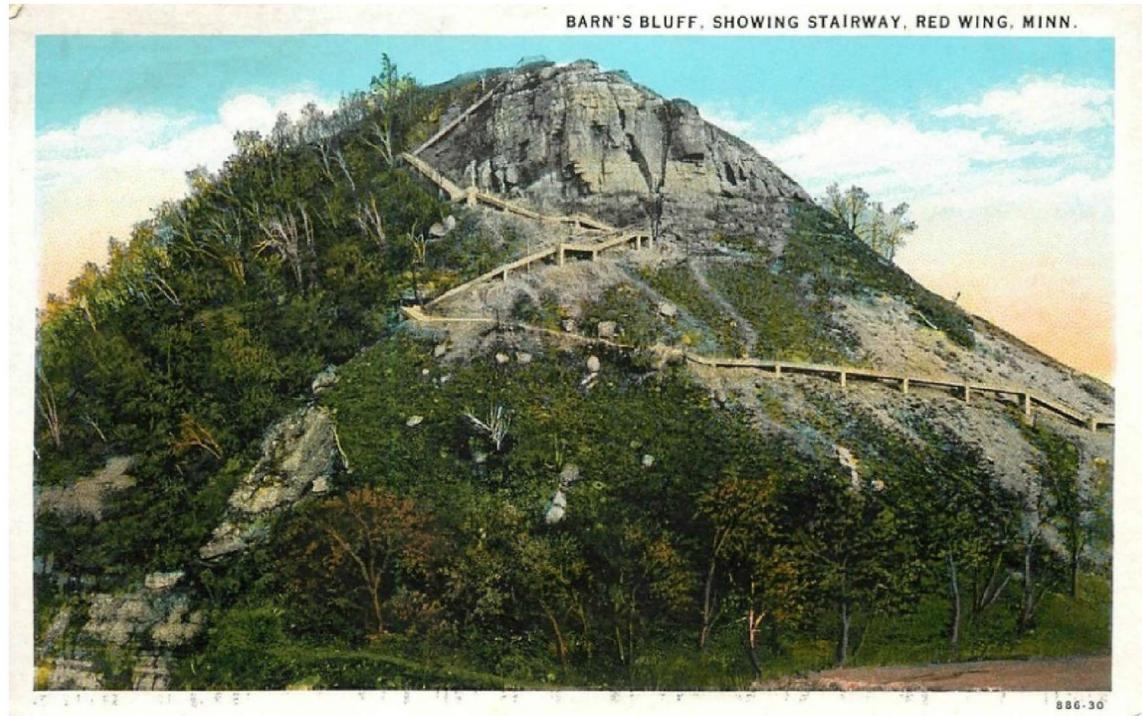


FIGURE 53. CITIZEN'S MEMORIAL STAIRWAY

Existing Condition

Two intact flights of steps, two small landings, and the uppermost overlook of the 1929 Citizen’s Memorial Stairway remain (Figures 54 and 55). Isolated fragments are also present on the bluff face. The lower of the two remaining intact flights retains 60 steps, and the upper flight has 51 steps for a total of 111 original steps. A third truncated flight with missing steps is present below the lowest extant landing (Figure 56). This broken stairway contains an additional nine steps for a total of 120 steps. The central landing is stamped “Knights of Columbus.” Pipe handrails are present along portions of the stairway. The existing railings are attached to the steps rather than the curbs. Evidence in the concrete of past fittings indicates the railings have been replaced. When first installed, the railings also lacked a middle rail.



FIGURE 54. LOWEST INTACT FLIGHT OF THE 1929 STAIRWAY



FIGURE 55. REMAINING LANDING OF THE 1929 CITIZEN’S MEMORIAL STAIRWAY

FIGURE 56. TRUNCATED BOTTOM FLIGHT OF THE 1929 STAIRWAY



Evaluation: Contributing

While the integrity of the Citizen's Memorial Stairway as a whole is poor, this remnant of the original 1929 stairway contains original materials (Figure 57), still functions as a trail connection between the North Trail and the Prairie Trail, and its overlook (now augmented with the 2014 West Overlook) continues to be used for its intended purpose (Figure 58). For its association with the development of Barn Bluff as a public park this remaining portion of the Citizen's Memorial Stairway should be considered a contributing element to the Barn Bluff Historic District.



FIGURE 57. DETAIL OF 1929 STAIRWAY STEPS WITH NAMES OF DONORS



FIGURE 58. UPPERMOST LANDING / WEST OVERLOOK OF THE 1929 CITIZEN'S MEMORIAL STAIRWAY PRIOR TO SUMMER OF 2014 CONSTRUCTION WORK, VIEW TO NORTHWEST

East Kiwanis Stairway

Historic Condition

The East Kiwanis Stairway was constructed in 1976 in order to restore access to Barn Bluff Park after the construction of the 1960 U.S. Route 63 high bridge resulted in the removal of the Citizen's Memorial Stairway at the west end of the bluff. Constructed in 1975-1976, the stairway incorporates steps that were salvaged from the original 1929 stairway.



FIGURE 59. EAST KIWANIS STAIRWAY AND PARK ENTRANCE

Existing Condition

The East Kiwanis Stairway forms the main entrance to Barn Bluff Park (Figure 59). The city's park entrance sign is located at the foot of the stair. The stairway consists of four flights that incorporate 143 steps salvaged from the 1929 Citizen's Memorial Stairway. The bottom two flights of the East Kiwanis Stairway are two steps wide, while the upper two flights are three steps wide (Figure 60).

All flights have pipe railings on either side of the stairway, with the bottom two flights having a central curb and railing between them and the upper two flights having a central railing but no middle curb. The landing between the third and fourth flights forms a plaza that incorporates an informational kiosk, four benches, and two interpretive boulder markers (Figure 61). A historical marker erected by the Minnesota Historical Society is located adjacent to the landing between the bottom two flights. The East

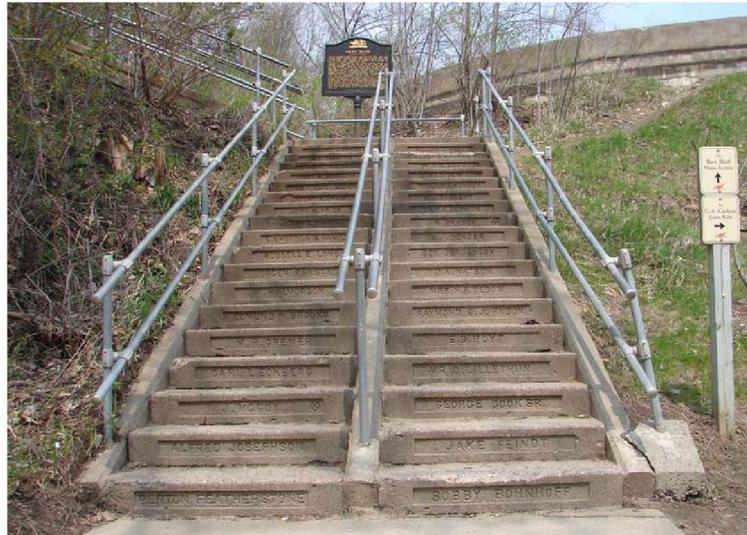


FIGURE 60. FIRST FLIGHT OF THE EAST KIWANIS STAIRWAY

Kiwanis Stairway provides connections to the South and North Trails. The integrity of the stairway is good, but some of the steps have begun to spall and cracks and losses are present in the curbs (Figure 62).

Evaluation: Contributing

The 1989 National Register nomination for the Barn Bluff Historic District describes the East Kiwanis Stairway as “a winding stair, consisting of approximately 100 concrete steps beginning near Fifth Street” as a contributing structure to the district “because of the history of the stair.”¹⁷ While less than 50 years in age, the East Kiwanis Stairway represents a continuation of the citizen movement to improve access to Barn Bluff which began in 1889 with the creation of Webster’s Way. For its association with this movement, and because it incorporates historic material from the 1929 stairway, it should be considered a contributing element to the Barn Bluff Historic District.



FIGURE 61. EAST KIWANIS STAIRWAY PLAZA WITH KIOSK, BENCHES, AND INTERPRETIVE MARKERS



FIGURE 62. DETAIL OF STEPS FROM THE 1929 STAIRWAY INCORPORATED INTO THE 1976 EAST KIWANIS STAIRWAY (NOTE DETERIORATION)

Central Kiwanis Stairway

Historic Condition

The Central Kiwanis Stairway was constructed in 1982 in order to alleviate one of the steepest portions of the South Trail (Figure 63).¹⁸ As with the original stairway on the west end of the bluff, the Kiwanis Club sold steps to members and community residents to raise funds for the steps.¹⁹ Donor's names are impressed into the steps and those that are Kiwanis members are denoted with an encircled "K" (Figure 64). City crews did the labor and provided materials. The stairway was dedicated in May of 1983.²⁰

Existing Condition

The central stairway consists of 86 poured concrete steps grouped in nine flights and incorporates 10 landings of various sizes. A limestone interpretive marker is the feature of an approximately 20-foot diameter octagonal concrete slab that forms a plaza at the bottom of the stairway. A dedication plaque from the original 1929 Citizen's Memorial Stairway formerly incorporated into the marker is no longer present (Figure 65).

Each flight of the stairway has a pipe handrail set into the curb along the east side of the steps. Each landing has benches to both the east and the west that are constructed of steps salvaged from the original 1929 Citizen's



FIGURE 63. CENTRAL KIWANIS STAIRWAY AND PLAZA WITH INTERPRETIVE MARKER



FIGURE 64. DETAIL OF THE STEPS OF THE 1982 STAIRWAY

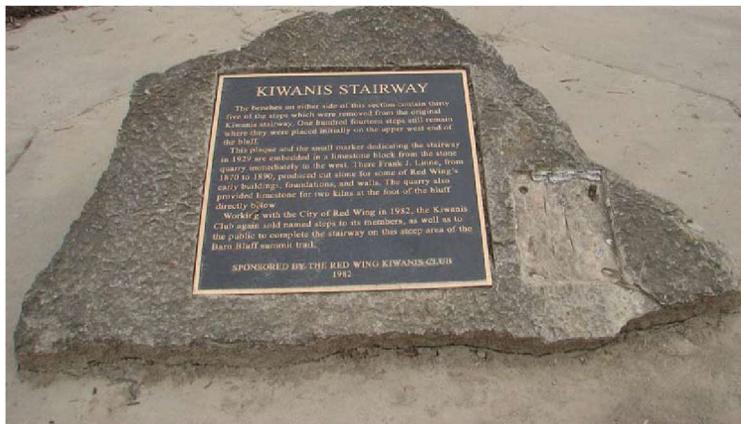


FIGURE 65. BOULDER MARKER AT FOOT OF THE CENTRAL STAIRWAY (NOTE MISSING 1929 PLAQUE AT RIGHT)



FIGURE 66. BENCH CREATED FROM STEPS SALVAGED FROM THE 1929 STAIRWAY



FIGURE 67. BENCHES AROUND THE UPPER LANDING OF THE CENTRAL STAIRWAY



FIGURE 68. SPALLING AND DETERIORATION EVIDENT ON SALVAGED STEPS FROM THE 1929 STAIRWAY

Memorial Stairway.²¹ Each bench consists of two original steps stacked and mortared together (Figure 66). Two benches are two steps wide and two steps tall. A total of 48 original steps form benches along the stairway. An additional 12 original steps form six benches set around a circular landing at the top of the stairway (Figure 67). Some of the original steps have begun to spall and deteriorate (Figure 68). The east side of the upper landing is partially covered in eroded material that has washed down the informal trail that connects the top of the stairway to the Prairie Trail.

Evaluation: Contributing to the Barn Bluff Historic District

The 1989 National Register nomination for the Barn Bluff Historic District identifies “a winding stair, consisting of approximately 100 concrete steps beginning near Fifth Street” as a contributing structure to the district “because of the history of the stair.”²² The stairway thus described is the 1976 East Kiwanis

Stairway, which, like the central stairway, incorporates steps from the original Citizen’s Memorial Stairway. While less than 50 years in age, the Central Kiwanis Stairway represents a continuation of the citizen movement to improve access to Barn Bluff which began in 1889 with the creation of Webster’s Way. For its association with this movement, and because it incorporates historical material from the 1929 stairway, it should be considered a contributing element to the Barn Bluff Historic District.

Prairie Trail

The Prairie Trail runs along the top of Barn Bluff from the West Overlook to the East Overlook (0.55 miles) (see Figure 42).

Historic Condition

The Prairie Trail is the outgrowth of the original bluff-top trail connecting the east and west overlooks (Figure 124). It is likely the oldest remaining trail segment in use on the bluff. Historical documentation of the trail is limited, but photographs taken in June of 1900 illustrate the trail's path along the rolling spine of Barn Bluff (Figure 69). The parallel ruts visible in the images suggest that the trail was used as a cart path, though no documentation of this use was encountered in this study beyond an 1874 panoramic map that refers to a "carriage drive to Barn Bluff park."²³ Historical aerial photographs, the earliest of which dates to 1938, document a segment of this trail along the north edge of the bluff that has since been abandoned.

Existing Condition

With the exception of the westernmost section, which was recently surfaced in gravel, the Prairie Trail is earthen (Figures 70 and 71). The ruts noted above are still visible on the east half of the bluff. The parallel ruts of a now abandoned, but early segment of the Prairie Trail can also be discerned passing through the oak savanna to the north of the present Prairie Trail at the west end of the bluff (see Figures 41 and 42). It is unclear if this remnant and the current trail were used concurrently or if one predates the other.

Two modern changes to the alignment of the Prairie Trail include the intentional creation of an arc to the south near the bluff's west point to direct park visitors away from a Native American earthwork/mound and towards the flagpole installed in 2011 (see Figure 42). A second alteration to a segment of the trail has developed since 1982. At the top of the connecting trail that park users created between the top of the Central Kiwanis Stairway and the Prairie Trail, the alignment of the trail has shifted to the south (see Figure 42).

Evaluation: Contributing

The bluff top Prairie Trail is a distinctive character-defining feature of the Barn Bluff Historic District that dates to the bluff's historic period and is fundamentally associated with visits to the bluff during the exploration period and its subsequent recreational use. Although small segments of the trail have been abandoned and others modified, the Prairie Trail retains excellent integrity of feeling, setting, and association. Both the present alignment of the Prairie Trail and the earlier alignment to the north through the oak savanna should be protected and preserved. Future use of gravel to surface the trail should be avoided as it is an incompatible material that detracts from the trail's integrity and that of the historic district as a whole.



FIGURE 69. TRAIL ACROSS TOP OF BARN BLUFF, VIEWS TO EAST, 1900
(MINNESOTA HISTORICAL SOCIETY)



FIGURE 70. PRAIRIE TRAIL, VIEW TO EAST



FIGURE 71. PRAIRIE TRAIL FROM NEAR EAST OVERLOOK, VIEW TO WEST

Midland Trail

The Midland Trail is an unimproved, earthen path that traverses the now wooded south slope of the bluff between the North and South trails (0.2 miles) (see Figure 42).

Historic Condition

Information is limited on the historic configuration of the Midland Trail which is located partway up the southeast side of Barn Bluff. An undated image of this portion of the bluff taken by photographer Henry Hamilton Bennet (1843-1908) indicates the presence of a worn footpath on this portion of the bluff (Figure 72). A 1900 photograph illustrates the present path passing to the rear of the houses and lots along East 3rd Street (Figure 73). This trail may have been formed by commuting kiln and quarry workers. While the Midland Trail now evokes a woodland path, both of these images illustrate that this portion of Barn Bluff was covered in prairie during the period of historical significance (1817-1939).

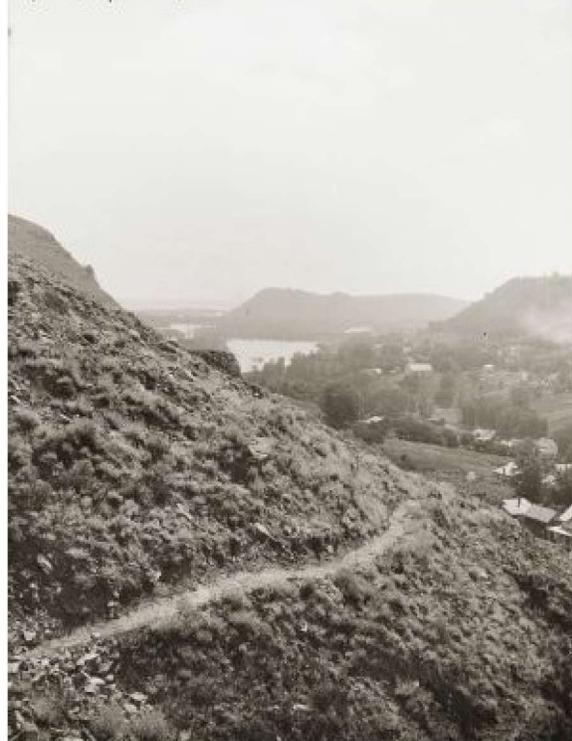


FIGURE 72. UNDATED PHOTOGRAPH BY HENRY HAMILTON BENNETT OF A TRAIL ON THE SOUTHEAST SIDE OF BARN BLUFF
(WISCONSIN HISTORICAL SOCIETY)



FIGURE 73. VIEW OF RED WING FROM BARN BLUFF SHOWING MIDLAND TRAIL (ARROW), 1900
(MINNESOTA HISTORICAL SOCIETY)

Existing Condition

At its east end, the Midland Trail passes through a small quarried area (see Figures 41 and 42). A retaining wall located along the trail edge at this location matches in form and style those associated with quarry operations (Figure 74). Additional retaining walls and terraces that were once part of the lots along East 3rd Street are present along the path.

Evaluation: Contributing

The Midland Trail is a distinctive character-defining feature of the Barn Bluff Historic District that dates to the bluff's historic period. While contained entirely within the boundary of the National Register district, only a portion of the Midland Trail is located on city land and the remainder is within Minnesota Department of Transportation right of way.



FIGURE 74. MIDLAND TRAIL, VIEW TO EAST

North Trail

The North Trail connects the East Kiwanis Stairway to the West Overlook by a path that travels along the north side of the bluff (0.9 miles) (see Figure 42)

Historic Condition

The east end of the North Trail follows a historic switchback road connecting to the quarries on the upper portion of the bluff. This road would have been developed circa 1870 (see Figures 42 and 124). The trail then crosses the floors of the G. A. Carlson and Twin City Lime and Cement Company’s pre-1908 quarries on the northeast side of the bluff. Between the west end of the quarries and the Citizen’s Memorial Stairway (West Kiwanis Stairway) the trail becomes a narrow earthen path. Little information is available on the historic presence or condition of this portion of the trail given the dense woodland canopy that covers this side of the bluff in historic images. However, a pre-1960 plan of the Citizen’s Memorial Stairway indicates that this 1929 construction included a trail connection off of a landing below the rock outcrop of which the “Indian Head” was a part (Figure 75).

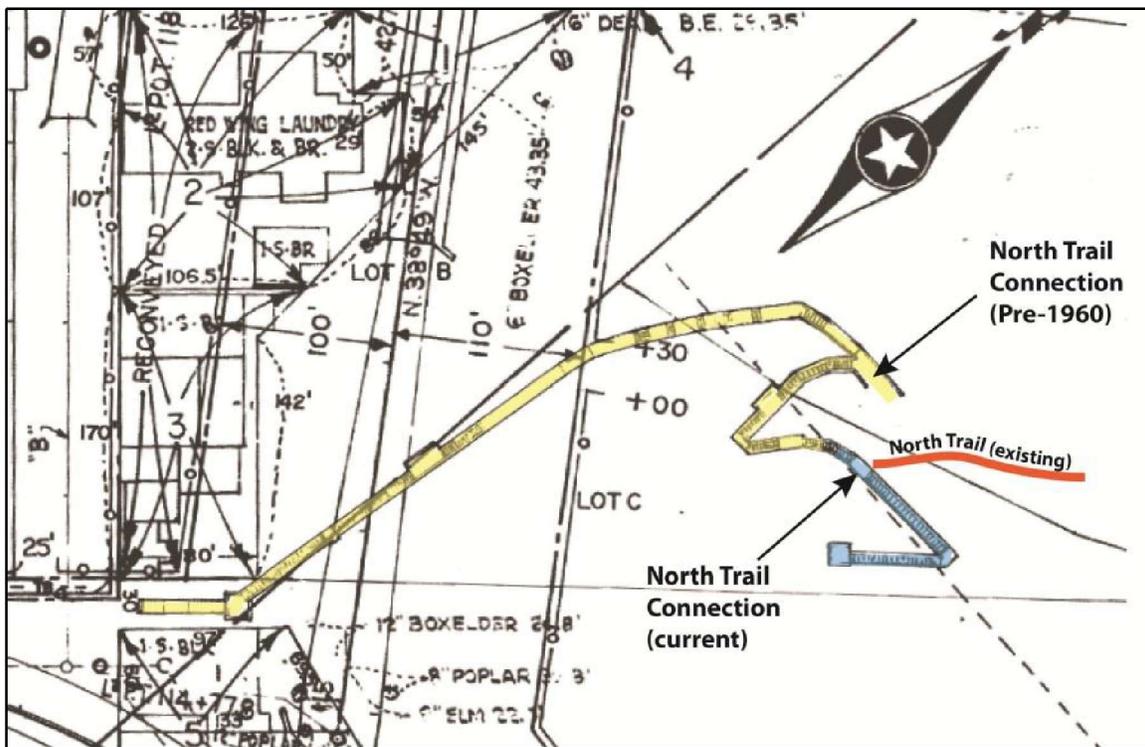


FIGURE 75. ORIGINAL NORTH TRAIL CONNECTION TO THE 1929 KIWANIS STAIRWAY
(STATE OF MINNESOTA DEPARTMENT OF HIGHWAYS, N.D.)

Existing Condition

Commencing at the East Stairway, the initial 150 feet of the North Trail is an earthen path that follows a trail visible on the 1938 aerial photograph (Figure 124). This path connects to the former quarry road that the North Trail then follows up the side of the bluff to the quarry floor. Between the west end of the quarries and the Citizen's Memorial Stairway (West Kiwanis Stairway), the North Trail is an unimproved woodland path. The original connection between the trail and the stairway was removed during the construction of the 1960 high bridge. The trail now connects to the lowest remaining landing of the 1929 stairway (Figure 76). Erosion has resulted in rock slides and losses along the trail between the quarry and stairway making passage difficult (Figure 77).



FIGURE 76. CONNECTION OF THE NORTH TRAIL WITH THE 1929 KIWANIS STAIRWAY, VIEW TO NORTHEAST

Evaluation: Contributing

The North Trail is a distinctive character-defining feature of the Barn Bluff Historic District that dates to the bluff's historic period.



FIGURE 77. NORTH TRAIL, VIEW TO WEST

South Trail

The South Trail provides a connection from the park entrance on the east to the Prairie Trail on the upper portion of the bluff on the west (0.5 miles). It incorporates the 1982 Central Kiwanis Stairway (see Figure 42).

Historic Condition

The South Trail did not exist during the period of significance for the Barn Bluff Historic District. Its construction post-dates the loss of the West Kiwanis Stairway connection and the removal of the East 3rd Street neighborhood at the foot of Barn Bluff. A segment of the trail follows the former alignment of a portion of East 3rd Street (see Figure 124).

Existing Condition

Commencing on the east at the East Kiwanis Stairway plaza, the South Trail is an earthen path that follows a cleared easement for overhead utilities (Figure 78). From the west end of the easement until its junction with the Midland Trail, the gravel-surfaced South Trail widens as it follows the approximate former trajectory of East 3rd Street (Figure 79). This area was graded and leveled when the homes in the area were removed and the U.S. Route 61/63 corridor was constructed.

To the west of its intersection with the Midland Trail, the South Trail climbs a steady grade to the plaza at the foot of the Central Kiwanis Stairway (Figure 80). This segment of the trail is also surfaced in gravel and the



FIGURE 78. SOUTH TRAIL ALONG UTILITY CORRIDOR



FIGURE 79. EAST 3RD ST. PORTION OF SOUTH TRAIL, VIEW TO EAST



FIGURE 80. INCLINED SEGMENT OF SOUTH TRAIL TO EAST OF THE CENTRAL KIWANIS STAIRWAY, VIEW TO WEST

use of concrete fill is evident. Clay tile pipes are installed at points along the trail to facilitate drainage. At the top of the stairway, the South Trail continues to the west skirting along the upper edge of the Linne quarry. Here the trail is cut into the side of the bluff and the earthen path is heavily eroded (Figure 81). Overgrown spoil piles from this cut are evident on the hillside to the northwest to the Linne quarry.



FIGURE 81. SOUTH TRAIL ABOVE THE LINNE QUARRY, VIEW TO WEST

Evaluation: Non-Contributing

The South Trail did not exist during the period of significance for the Barn Bluff Historic District. While a portion of the trail follows the former alignment of a segment of East 3rd Street, due to the demolition of the neighborhood and subsequent grading, the roadway has lost its historical integrity. Furthermore the East 3rd Street portion of the trail is located within Minnesota Department of Transportation right of way and only partially within the boundary of the National Register district. Given its recent history, the South Trail does not contribute to the significance of the Barn Bluff National Register Historic District as a character-defining structure of the historic period.

South Trail - Prairie Trail Connector

An unnamed 190-foot long path connects the top of the Central Kiwanis Stairway with the Prairie Trail (see Figure 42).

Historic Condition

The South Trail – Prairie Trail Connector did not exist during the period of significance for the Barn Bluff Historic District. Park users created this informal path after the construction of the Central Kiwanis Stairway in 1982. In response to the use of this trail, a segment of the Prairie Trail was abandoned by park users and a new segment was developed near the head of the connecting trail.

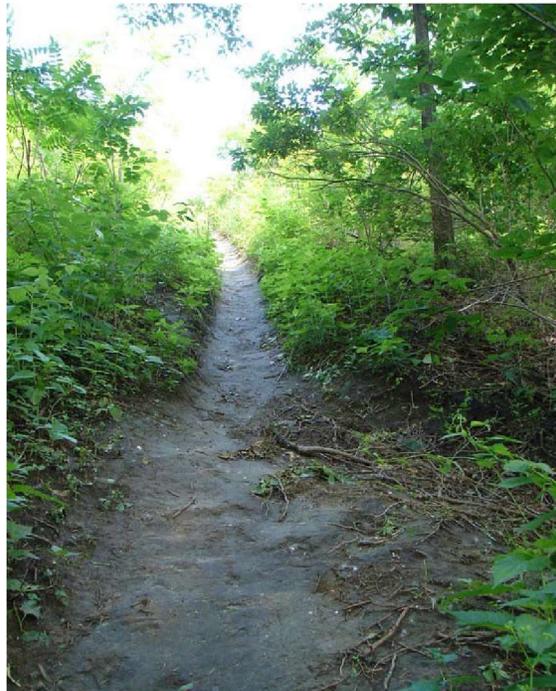


FIGURE 82. CONNECTING PATH BETWEEN THE SOUTH TRAIL AND THE PRAIRIE TRAIL, VIEW TO NORTHEAST

Existing Condition

The South Trail – Prairie Trail connector is a heavily-eroded, steep path of an informal nature, although wayfaring signs at both ends of the trail indicates its incorporation into the park’s trail network. Material eroding down this path accumulates on the upper plaza of the Central Kiwanis Stairway.

Evaluation: Non-Contributing

The South Trail – Prairie Trail Connector does not contribute to the significance of the Barn Bluff National Register Historic District as a character-defining structure of the historic period.

Carlson Lime Kiln Trail

This 0.15-mile long trail provides a connection from East 5th Street to the G. A. Carlson Lime Kiln (see Figure 42).

Historic Condition

Prior to 1875, the Milwaukee and St. Paul Railway constructed a spur track to service G. A. Carlson’s lime works at the east end of Barn Bluff. The track diverged from the main line just to the west of the 1882 kiln and arced around the bluff base to the southeast (Figure 83).²⁴

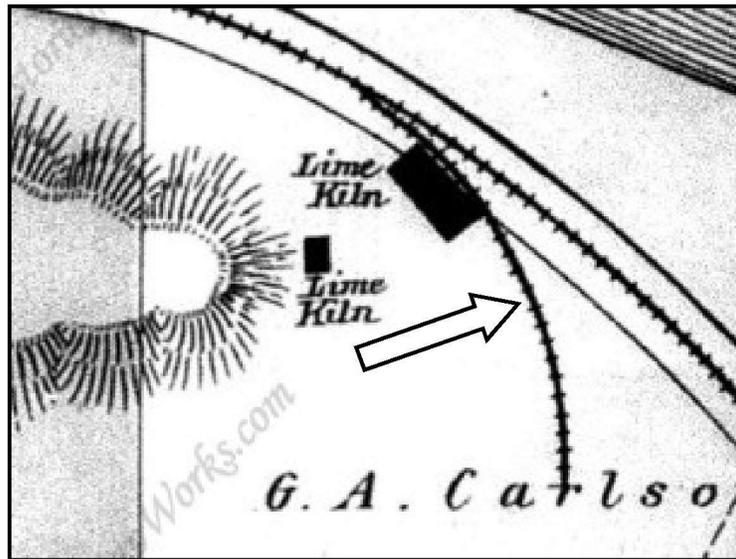


FIGURE 83. SPUR TRACK ILLUSTRATED ON 1894 PLAT MAP

Existing Condition

From approximately the city’s pump house north, the Carlson Lime Kiln Trail follows the alignment of this former rail spur, which is now a 16-ft wide gravel access road (Figure 84).

**Evaluation: Non-Contributing to Barn Bluff Historic District (current);
Feature of the G.A. Carlson Pioneer Lime Works Site (21GD297)**

This trail segment is presently outside the boundary of the Barn Bluff Historic District and is not associated with its presently defined areas of significance. However, this spur is a remnant of the G. A. Carlson Pioneer Lime Works and is considered a contributing element to that historically significant site. Should the district’s boundaries and areas of significance be expanded to encompass this feature, it would be recommended as a contributing resource.



FIGURE 84. G. A. CARLSON LIME KILN TRAIL, VIEW TO SOUTHEAST

East Overlook – East 3rd Street Trail

This trail segment (0.2 miles) consists of an eroded footpath connecting the East Overlook with the former alignment of East 3rd Street (see Figure 42).

Historic Condition

Information on the historic appearance of this trail is limited. The presence of this path is recorded on aerial photographs dating to 1938. Historically, the path's alignment departed East 3rd Street at the point where it turns to the southeast. From that point the trail angled up the south slope to the bluff top heading east from there to the East Overlook.

Existing Condition

The trail between the East Overlook and East 3rd Street is still evident. On the upper bluff it is a heavily-eroded, steep path that descends into the south forest. The path's route joins the South Trail to the west of that trail's intersection with the Midland Trail. An abandoned continuation of the East Overlook – East 3rd Street Trail is present to the south of the South Trail. The trail is not signed and is not part of the designated trail network within Barn Bluff Park, but it is used by park visitors.

Evaluation: Contributing

The East Overlook – East 3rd Street Trail is a character-defining feature of the Barn Bluff Historic District that dates to the bluff's historic period.

Road Traces

Road traces are segments of former roads that since abandonment have become overgrown, but the roadbed of which is still discernible (see Figure 41).

Existing Condition

During the course of this study three road traces were identified. Additional, as yet undiscovered, road traces may be present on Barn Bluff.

The roadway that connected the quarry and kilns of F. J. Linne can be traced partway on the southeast corner of Barn Bluff. This road trace is visible along the south trail just to the east of the bottom of the Central Kiwanis Stairway. The remainder of this road, which once connected with Bluff Street was removed when portions of the bluff were removed in the late 1950s.

A road trace on the north face of the bluff is discernible on aerial photographs and LiDAR imagery. This road connected the quarry of the Twin City Lime and Cement Company with the kilns below.

A connecting series of roads can be discerned on the hillside to the south of the G. A. Carlson lime kiln. These roads formerly connected the quarry and kilns with a stone yard adjacent to the railroad siding at the foot of the bluff (Figure 86)

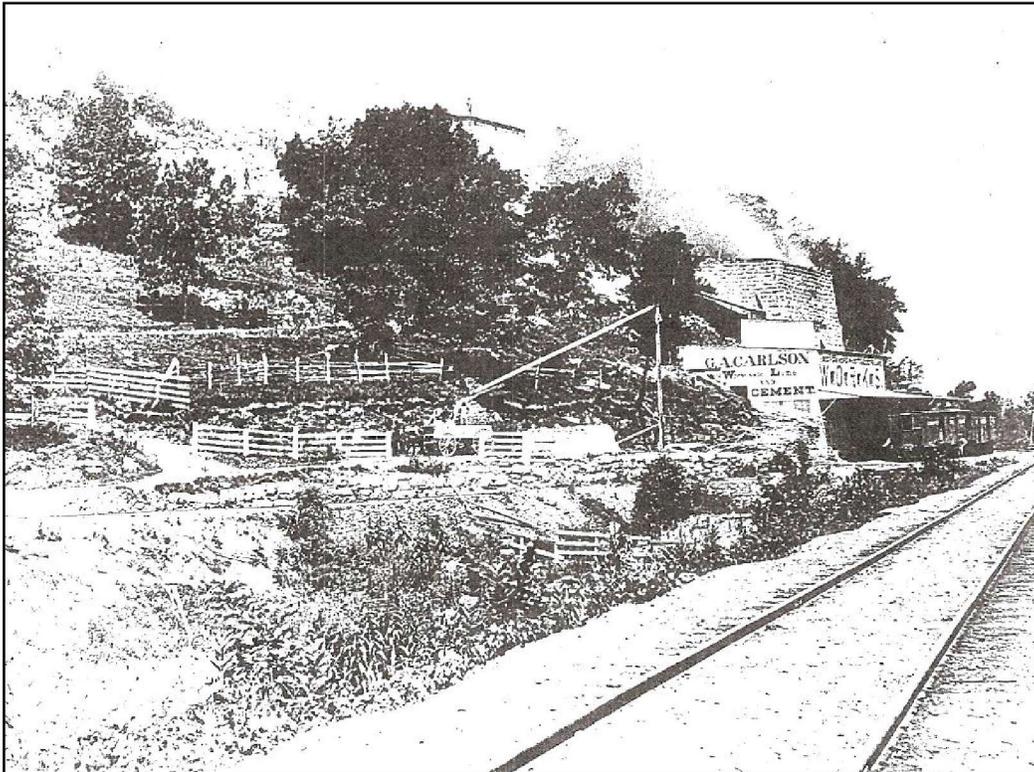


FIGURE 85. SWITCHBACK ROADS NEAR THE G. A. CARLSON LIME KILN ARE VISIBLE AT LEFT IN THIS C. 1885 PHOTOGRAPH OF THE LIME WORKS, VIEW TO WEST

(GOODHUE COUNTY HISTORICAL SOCIETY)

**Evaluation: *Non-Contributing to Barn Bluff Historic District (current)
Feature of the Pioneer Lime Works Site (21GD297) – East Quarry
Undetermined (Linne and Twin City Lime & Cement Co. Roads)***

Although not always readily discernable to the untrained eye, historic road traces contribute to the historic character of the Barn Bluff Historic District. However, the road segments identified are related to the stone quarrying and lime manufacturing industries, which are presently not associated with the Barn Bluff Historic District's defined areas of significance (Exploration/Settlement and Recreation/ Entertainment). The roads associated with G. A. Carlson Red Wing Pioneer Lime Works are considered a contributing element to that historically significant resource. The integrity and historical significance of the Linne and Twin City Lime & Cement Company sites has not yet been evaluated. Should the Barn Bluff Historic District's areas of significance be expanded to include these industries, these road traces should be evaluated for inclusion in the district.

VEGETATION

Historic Condition

Mid-19th century images of Barn Bluff indicate that the north face of the bluff towards the Mississippi River was forested, while nearly the entirety of the bluff top and south exposures were once prairie/grassland (Figure 86). Bedrock exposures were visible on upper portions of the bluff. In 1820, Henry Schoolcraft wrote, "It presents an abrupt mural precipice towards the Mississippi, but slopes off gradually towards the south, and is covered with grass, and a few scattering oaks."²⁵ Aerial photographs and historic images document a nearly identical distribution of habitat coverage through the mid-20th century (Figure 87). Despite Red Wing's 19th-century industries exhausting the wood supply for miles around the city, the north face of the bluff remained wooded likely because its steep slope did not facilitate logging (Figure 88). While there were discussions of planting shade trees on the bluff in the 19th century and an attempt was made to plant evergreens in 1963, these efforts did not meet with success and no other evidence was encountered during this study for formal plantings in connection with park development.²⁶

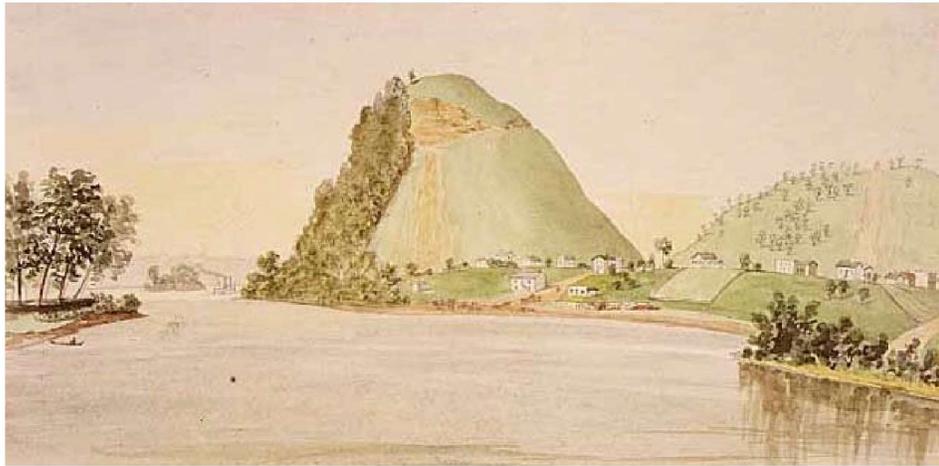


FIGURE 86. EDWIN WHITEFIELD'S C.1856 PAINTING ILLUSTRATES BARN BLUFF'S WOODED NORTH FACE, EXPANSIVE PRAIRIE, AND EXPOSED BEDROCK

(MINNESOTA HISTORICAL SOCIETY)



FIGURE 87. AERIAL PHOTOGRAPH FROM 1953 ILLUSTRATING WOODED NORTH SLOPE AND EXTENT OF PRAIRIE ON BARN BLUFF'S SOUTH SLOPE
(CONNOLLY 2014, U.S. FISH AND WILDLIFE SERVICE)



FIGURE 88. WOODED NORTH SLOPE OF BARN BLUFF FROM THE MISSISSIPPI RIVER, 1900
(MINNESOTA HISTORICAL SOCIETY)

Existing Condition

Today, Barn Bluff exhibits four principal habitat types (prairie, oak savanna, oak grove, and deciduous forest). Historical accounts and images indicate that these vegetation communities were historically present on the bluff, although their boundaries have changed over time, and invasive plant species have been introduced. The principle changes in vegetation have occurred on the south slope where an oak grove has spread up the hillside in the vicinity of the Linne quarry and the South Forest has expanded since the removal of the East 3rd Street neighborhood. Occasional landscape plants, such as lilacs and daylilies, are also present in the southeast quadrant of the bluff where houses were once located along East 3rd Street.



FIGURE 89. PRAIRIE WITH OAK GROVES IN THE BACKGROUND ON THE BLUFF'S SOUTHERN EXPOSURE



FIGURE 90. WILD GINGER ON NORTH SLOPE

Evaluation: Contributing (Native Vegetation)

The native vegetation of Barn Bluff, in particular the wooded north slope, the oak savanna on the periphery of the bluff, and native prairie on the south slope and bluff top are distinctive character-defining features of the Barn Bluff Historic District. Management techniques should focus on the rehabilitation of these native plant communities and re-establishment of their historic extent.

Because the former East 3rd Street neighborhood is not associated with the district's areas of significance removal of landscape plants in this area would not diminish the historic character of the district. Likewise the removal of invasive species to foster the growth of native vegetation is compatible with treatment goals.

STRUCTURES

G. A. Carlson Lime Kiln (GD-RWC-20)

Historic Condition

In 1882, G. A. Carlson constructed a two-chambered kiln at the foot of Barn Bluff directly below his 1872 tunnel kiln.²⁷ This enterprise consisted of two perpetual kilns enclosed within a single massive limestone structure built into the base of the bluff and immediately adjacent to the railroad spur (Figure 91). The industrial complex of which the kiln was a part also included an attached lime dry house and a “lime and cement depot,” while a stone yard accessed by cart roads and equipped with a pole derrick was located a little further to the east.

Existing Condition

The double-chambered limestone kiln structure is the only extant portion of the G. A. Carlson Pioneer Lime Works that remains at the foot of Barn Bluff (Figure 92). Foundations around the kiln, document the lime house and depot that once wrapped around the three exposed sides of the structure.

The remains of the kiln’s industrial complex together with Carlson’s Tunnel Kiln, the roadways that connected the kilns to quarries on the upper portion of the bluff, the quarries, and a devoted rail spur and other ancillary features are encompassed by the G. A. Carlson Red Wing Pioneer Lime Works archaeological site (21GD297). For additional documentation of the kiln, see the Historic Structures Report.²⁸

***Evaluation: Non-Contributing to Barn Bluff Historic District (current);
Individually Listed on the National Register of Historic Places;
Feature of the G.A. Carlson Pioneer Lime Works Site (21GD297)***

The G. A. Carlson Lime Kiln is presently located outside the boundary of the Barn Bluff Historic District and not associated with its presently defined areas of significance. However, the G. A. Carlson Lime Kiln is individually listed on the National Register of Historic Places. Should the Barn Bluff Historic District’s boundaries be expanded and areas of significance broadened to include the stone quarrying and lime manufacturing industries, the G. A. Carlson Lime Kiln would be a contributing resource.



FIGURE 91. G. A. CARLSON'S 1882 KILN, c. 1885
(GOODHUE COUNTY HISTORICAL SOCIETY)



FIGURE 92. G. A. CARLSON'S 1882 LIME KILN

G. A. Carlson Tunnel Kiln

Historic Condition

The Tunnel Kiln was G. A. Carlson's first kiln in operation on Barn Bluff. Constructed in 1872, it is the only kiln indicated on Barn Bluff on an 1874 map of Red Wing.²⁹ This kiln utilized the natural topography of the bluff to create a kiln chamber and chimney. A horizontal tunnel was excavated into the bluff to access a vertical shaft into which the limestone was dropped from above. According to historical records, the kiln's vertical shaft was 90 ft. deep, while the horizontal tunnel was excavated 150 ft. into the bluff.³⁰ The interior of the tunnel contained rails that facilitated the transport of the finished lime to the lime house.

Existing Condition

The visible portion of the Tunnel Kiln consists of a limestone tunnel entrance constructed of 2-ft. thick block (Figure 93). The tunnel passage is roughly 30 foot in length to a point at which it is caved-in with rubble due to a 20th century collapse.³¹ On the bluff side above the kiln and at a distance of 35 ft. back from the tunnel face is a depression in the hillside that marks the location of the collapse. On the east edge of Carlson's quarry atop barn bluff, a distinct depression marks the apparent upper entrance to the tunnel kiln. This location is at the correct distance, elevation, and bearing to be the tunnel kiln's entrance.



**FIGURE 93. TUNNEL KILN ENTRANCE,
VIEW TO NORTHWEST**

***Evaluation: Non-Contributing to Barn Bluff Historic District (current);
Contributing to G.A. Carlson Pioneer Lime Works Site (21GD297)***

While dating to Barn Bluff's period of significance, the 1874 tunnel kiln is not associated with the Barn Bluff Historic District's defined areas of significance (Exploration/Settlement and Recreation/Entertainment). The kiln is a remnant of the G. A. Carlson Red Wing Pioneer Lime Works and is considered a contributing element to that historically significant site. Should the Barn Bluff Historic District's areas of significance be expanded to include the stone quarrying and lime manufacturing industries, the G. A. Carlson Tunnel Kiln is recommended as a contributing resource.

Limestone Quarries

From the 1860s through 1908 extensive stone quarrying took place on Barn Bluff. While quarries are classified in the National Register guidelines as “sites” rather than “structures,” the quarries of Barn Bluff are included here as they are inherently related to the kiln structures.



FIGURE 94. F. J. LINNE QUARRY

Historic Condition

Three principal quarries, those of F. J. Linne, the Twin City Lime and Cement Company (Figure 94), and G. A. Carlson, were in operation on the bluff. The Linne quarry was located on the south face of the bluff overlooking East Red Wing. The Twin City Lime and Cement Company’s quarry was on the north face of the bluff (Figure 95) and to the immediate west of G. A. Carlson’s quarry, which wrapped around the upper portion of the bluff’s east end (Figure 125).

Existing Condition

Each of the quarries on Barn Bluff are still evident and have not been altered since quarrying ceased in 1908.

***Evaluation: Non-Contributing to Barn Bluff Historic District (current)
Feature of the Pioneer Lime Works Site (21GD297) – East Quarry
Undetermined (Linne and Twin City Lime & Cement Co. Quarries)***

While dating to Barn Bluff’s period of significance, and instrumental in the shaping of the bluff’s current landform, the quarries are not associated with the Barn Bluff Historic District’s defined areas of significance (Exploration/Settlement and Recreation/ Entertainment). The east quarry is encompassed by the G. A. Carlson Red Wing Pioneer Lime Works archaeological site and is a considered a contributing element to that historically significant resource. The integrity and historical significance of the Linne and Twin City Lime & Cement Company quarries has not yet been evaluated, but it is anticipated that they would be considered eligible within the context of Red Wing’s lime and stone industry. Should the Barn Bluff Historic District’s areas of significance be expanded to include these industries, the quarries should be evaluated for inclusion in the district.



FIGURE 95. NORTH QUARRY OF THE TWIN CITY LIME AND CEMENT COMPANY

City Water Department Pump House No. 2 (GD-RWC-1378)

Historic Condition

City Water Department's Pump House No. 2, which consists of a control building and reservoir, was constructed c. 1920 at the foot of Barn Bluff's east slope. The historic appearance of the structures is not known, but comparison with the 1938 aerial photograph and the lack of evidence for extensive modifications suggests they remain relatively unchanged.



FIGURE 96. PUMP HOUSE NO. 2

Existing Condition

The control building house is a single-story, rectangular, brick structure with a poured concrete foundation and a flat roof. Window openings (3 in the south façade, 3 in the east façade, and two in the north façade) have been filled with concrete block. Metal doors are present in the east and north facades. The lack of a lintel over the north door suggests it may have been added after construction.



FIGURE 97. RESERVOIR AND PUMP HOUSE

The poured concrete reservoir is partially constructed into the bluff and is surrounded by a buttressed concrete wall.

***Evaluation: Non-Contributing to Barn Bluff Historic District;
Recommended Eligible for Listing in the National Register***

City Water Department's Pump House No. 2 is currently located outside the boundary of the National Register-listed Barn Bluff property. While Pump House No. 2 was constructed during Barn Bluff's period of significance, its function is outside the bluff's areas of significance (Exploration/Settlement and Entertainment/Recreation). Furthermore, its location on City property on the back side of Barn Bluff is rather incidental to its purpose. Therefore, should future revision of the property boundary encompass Pump House No. 2, it would not contribute to the site's historical significance.

It should be noted, that City Water Department Pump House No. 2 has been previously evaluated as potentially eligible for listing in the National Register for its association with community planning and development (Criterion A). While it does not contribute to the historical significance of Barn Bluff, it may be eligible for listing on the National Register as an individual property.

Kiosk/Shelter and Benches

Historic Condition

The kiosk/shelter and benches located on the plaza of the East Kiwanis Stairway did not exist during the period of significance for the Barn Bluff Historic District. The kiosk was constructed in 2003 with partial assistance from a Certified Local Government (CLG) grant received by the Red Wing Heritage Preservation Commission (HPC). The incorporation of the benches into the 1975/1976 stairway suggests they date to that era.

Existing Condition

A small, hip-roofed, timber-framed kiosk/shelter that provides information on the park's trail network and four pipe and wood-slat benches (including one within the kiosk/shelter) are also present at the East Kiwanis Stairway plaza (Figures 98 and 99).

Evaluation: Non-Contributing

The kiosk/shelter and benches do not contribute to the significance of the Barn Bluff National Register Historic District as a character-defining structure of the historic period.



**FIGURE 98. KIOSK/SHELTER,
VIEW TO SOUTH**



**FIGURE 99. BENCH ON EAST
STAIRWAY PLAZA**

West Overlook (2014)

Historic Condition

The West Overlook completed in 2014 did not exist during the period of significance for the Barn Bluff Historic District. The new overlook was constructed near, but not immediately adjacent to the remnant overlook of the 1929 Citizen's Memorial Stairway.

Existing Condition

Constructed of limestone block and pavers, the West Overlook provides a new terminus for the Prairie Trail (Figure 100). The overlook incorporates the same style of pipe handrail that was historically used on the 1929, 1976, and 1982 Kiwanis stairways. During the construction of the overlook, the railing on the remnant 1929 overlook was also replaced.

Evaluation: Non-Contributing

The 2014 West Overlook does not contribute to the significance of the Barn Bluff National Register Historic District as a character-defining structure of the historic period.



**FIGURE 100. WEST OVERLOOK COMPLETED IN 2014, VIEW TO NORTHWEST
(FRIENDS OF THE BLUFFS)**

SMALL-SCALE FEATURES

Flagpole Base (1929)

Historic Condition

This formed concrete flagpole base was installed atop Barn Bluff in 1929 by the Red Wing American Legion Post 54. The flagpole was placed atop Mound 1, which is the bluff's largest Native American earthwork/mound, and its footing was excavated into the mound.



FIGURE 101. AMERICAN LEGION 1929 FLAGPOLE BASE, VIEW TO THE NORTH

Existing Condition

To its pyramidal top the poured concrete flagpole base stands approximately 30 inches tall. The former steel flagpole was cut off just above the concrete base (Figure 101). Due to erosion, 21 inches of the aggregate footing is partially exposed. On the top of each side of the base there is molded lettering that reads clockwise from the south "AMERICAN LEGION DRUM CORPS // AMERICAN LEGION // AMERICAN LEGION AUXILLARY // POST 54" (Figure 102). The sides of the monument are presently painted light blue; which is a modification made since 2010.³²



FIGURE 102. 1929 FLAGPOLE BASE, VIEW TO SOUTHWEST

Evaluation: Contributing

This concrete flagpole base dates to the same year as the completion of the Citizen's Memorial Stairway (West Kiwanis Stairway). It is recommended as a contributing element to the Barn Bluff National Register Historic District as an element that dates to the period of significance and is associated with the development of Barn Bluff as a public park.

The flagpole base retains its integrity of location, setting, feeling, and association, despite the loss of the pole itself. In order to limit further impacts to the protected Native American earthwork/mound, it is recommended that the pole not be restored or enhanced in any fashion, nor that the flagpole base be moved.

Flagpole (2011)

Historic Condition

This flagpole is a modern feature that did not exist during Barn Bluff's period of significance.

Existing Condition

In 2011, Red Wing American Legion Post 54 erected a new flagpole atop Barn Bluff (Figure 103). A new segment of the Prairie Trail was created to lead visitors to the flagpole and to decrease pedestrian traffic across Mound 1. The one-foot diameter flagpole is octagonal with each side measuring 3.5 inches. A plaque partway up the pole and featuring a silhouette of a soldier reads "This Flag is // dedicated to the // Veterans of // Iraq and // Afghanistan // June 14, 2011 // American Legion Post 54". The flag is lit by two solar-powered lights that are attached to the pole above the plaque.

Evaluation: Non-Contributing

The 2011 flagpole does not contribute to the significance of the Barn Bluff National Register Historic District as a character-defining small-scale feature of the historic period.



FIGURE 103. AMERICAN LEGION FLAGPOLE ERECTED IN 2011

Limestone Walls (Kiln/Quarry Related)

Historic Condition

Due to the steep slopes upon which the lime works were situated, retaining walls were constructed of limestone both immediately around the kilns, but also along the roads that climbed the bluff.

Existing Condition

Retaining walls have been documented proximate to the rail spur that serviced the G. A. Carlson lime works and also along the roads (now segments of the North and Midland Trails) that connected the kilns to the quarries and downtown Red Wing (Figure 104).

***Evaluation: Non-Contributing to Barn Bluff Historic District (current);
Feature of the G.A. Carlson Pioneer Lime Works Site (21GD297)***

Limestone retaining walls that are associated with the operation of the G. A. Carlson Red Wing Pioneer Lime Works (21GD297) are considered a contributing element to that historically significant site. While these features date to the Barn Bluff Historic District's historic period of significance, they are presently not associated with the identified areas of significance (Exploration/Settlement and Recreation/Entertainment). However, should the district's areas of significance be expanded to encompass the stone quarrying and lime manufacturing industries, limestone retaining walls associated with these industries would be recommended as contributing resources.



FIGURE 104. QUARRY ROAD RETAINING WALL ALONG THE NORTH TRAIL, VIEW TO WEST

Limestone Walls, Cistern and Features of East 3rd Street Neighborhood

Historic Condition

Prior to the construction of the U.S. Route 61/63 highway corridor, the East 3rd Street residential neighborhood was located at the base of Barn Bluff's south slope. While some homes were present in this area by the 1890s, additional homes were constructed during the first part of the 20th century. Due to the steep slopes present at the back of the parcels along the north side of 3rd Street, many of the lots on that side of the road featured limestone terraces and retaining walls. This neighborhood was removed to make way for the highway in the late 1950s.

Existing Condition

The former location of the East 3rd Street residential neighborhood is denoted by a largely level area through which a portion of the South Trail runs. Features at the rear of the former lots, such as retaining walls (Figure 105), terraces, a cistern (Figure 106), root cellar, and the presence of landscape plants, including lilac bushes and lilies, hint at the presence of the former homes. However, no foundations or slabs are evident indicating that the homes were fully removed at the time of their demolition. The extent of this disturbance was confirmed by limited shovel testing conducted during this study. Shovel tests revealed a shallow and truncated soil profile consistent with an area that has been graded indicating a low potential for archaeological resources as well.



FIGURE 105. TERRACES WITH RETAINING WALLS AT THE BACK OF A FORMER EAST 3RD STREET LOT



FIGURE 106. HILLSIDE CISTERN

Evaluation: Non-Contributing

The lots associated with the East 3rd Street neighborhood and their remnant features are located on MnDOT right of way and only partially within the boundary of the Barn Bluff Historic District. The features of the East 3rd Street neighborhood, while dating to the historic district's period of significance (1817-1939) are not associated with either the exploration of the upper Mississippi River or the recreational use of the bluff and therefore do not contribute to the significance of the Barn Bluff Historic District.

National Geodetic Survey Marker

Historic Condition

This National Geodetic Survey marker, which was established atop Barn Bluff in 1893, was reset in 1990. It is set atop Mound 1, which is the bluff's largest Native American earthwork/mound (Figure 107).



FIGURE 107. GEODETIC SURVEY MARKER AND 1929 FLAGPOLE BASE, VIEW TO NORTHEAST

Existing Condition

The surface marker consists of a brass plug within a 30-cm diameter, circular concrete monument. The monument is stamped in the center “RED WING / MRC / 1895 1990”

within a circular inscription that reads “HORIZONTAL CONTROL MARK / FOR INFORMATION OR TO REPORT DAMAGE WRITE / THE DIRECTOR / NATIONAL GEODETIC SURVEY / WASHINGTON, D.C.” According to the National Geodetic Survey datasheet, this surface marker indicates the location of a 15-cm diameter underground brass marker embossed “1893” and set within a square, clay tile.³³

Evaluation: Non-Contributing

The modern surface element does not contribute to the significance of the Barn Bluff National Register Historic District as a character-defining small-scale feature of the historic period, nor is the underground marker associated with the bluff's areas of significance.



FIGURE 108. GEODETIC SURVEY MARKER

This feature is a recorded geocache location, which contributes to foot traffic across the mound.³⁴

Interpretive Markers, Information Signs, and Wayfinding Aids

Historic Condition

Interpretive and directional signage largely did not exist during the period of significance. Exceptions are signage and plaques associated with the Citizen's Memorial Stairway and its predecessor "Webster's Way." Historical images indicate that a sign supported on posts identified the bluff trail as "Webster's Way" (Figure 109). It is not known how long the sign remained. When the 1929 Citizen's



FIGURE 109. THE "WEBSTER'S WAY" SIGN (ARROW) IS VISIBLE IN THIS C. 1900 PHOTOGRAPH (MINNESOTA HISTORICAL SOCIETY)

Memorial Stairway was completed, a signboard of similar construction stood on the bluff near the stairway's first landing, but its content cannot be discerned (Figure 110). A plaque was also set in the south newel post at the stairway's entry. This plaque was salvaged and reset in the 1982 Central Kiwanis Stairway boulder marker, although it has since been vandalized (see Figure 65). The salvaged plaque read: "MEMORIAL STAIRWAY / DEDICATED TO / THE PIONEERS AND BUILDERS OF THE CITY OF RED WING / PLANNED AND ERECTED BY THE KIWANIS CLUB / 1929." The portion of the bluff where these signs and plaque were once located was removed during the construction of the 1960 high bridge.

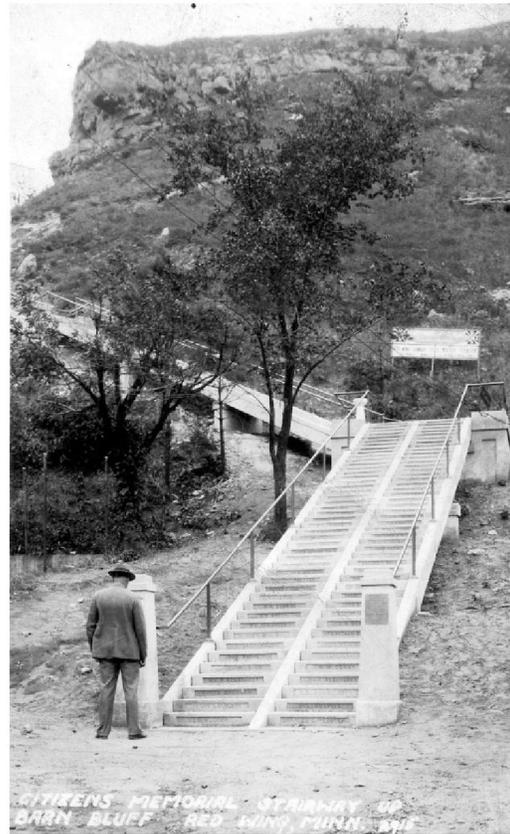


FIGURE 110. CITIZEN'S MEMORIAL STAIRWAY PLAQUES AND HILLSIDE SIGN, c. 1929

Barn Bluff's prominence also resulted in its use as a site for billboards. Photographs from c. 1900 indicate the presence of a billboard on the toe slope at the northwest corner of the bluff (see Figure 109) and a large billboard atop the west end of the bluff for Wing & Olson Clothiers (Figure 111). These features no longer remain, and like features associated with the lime manufacturing industries are related to the commercial use of Barn Bluff, which is not an identified area of historical significance.



**FIGURE 111. WING & OLSON
CLOTHIERS BILLBOARD ATOP
BARN BLUFF, 1897**

(MINNESOTA HISTORICAL
SOCIETY)

Existing Condition

At present interpretive markers within Barn Bluff Park consist of three plaque and boulder monuments (“Mt. La Grange – Barn Bluff” - 1978; “Kiwanis Stairway” [East] - 1976; and “Kiwanis Stairway” [Central] - 1982); a standard cast, post-mounted Minnesota historical marker (“Barn Bluff” - 1989); and a plaque set in a monument built of cut limestone (“G.A. Carlson Lime Kiln” – 2003) (Figure 112). Most of these monuments were created during the 1970s and 1980s. The Carlson Lime Kiln monument and the park entrance sign near the foot of the East Kiwanis Stairway were completed in 2003 with partial assistance from a Certified Local Government (CLG) grant received by the Red Wing Heritage Preservation Commission (HPC). At that time, the city also installed wayfinding and interpretive signs along the trails throughout the park.

The Kiwanis Stairway boulder monument set in the plaza at the foot of the central stairway incorporated one of the original plaques from the Citizen’s Memorial Stairway. However, the monument has been vandalized and the plaque removed. Online images indicate that the plaque was removed between September of 2010 and October of 2011.³⁵

Evaluation: Non-Contributing

Interpretive and directional signage does not contribute to the significance of the Barn Bluff National Register Historic District as a character-defining small-scale feature of the historic period.

**BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT**



Kiwanis Stairway - 1976

Mt. La Grange – Barn Bluff, 1978



Kiwanis Stairway - 1982

Barn Bluff - 1989



G. A. Carlson Lime Kiln – 2003

City Park Entrance Sign - 2003

FIGURE 112. INTERPRETIVE MARKERS AND SIGNS

Utility Corridors

Historic Condition

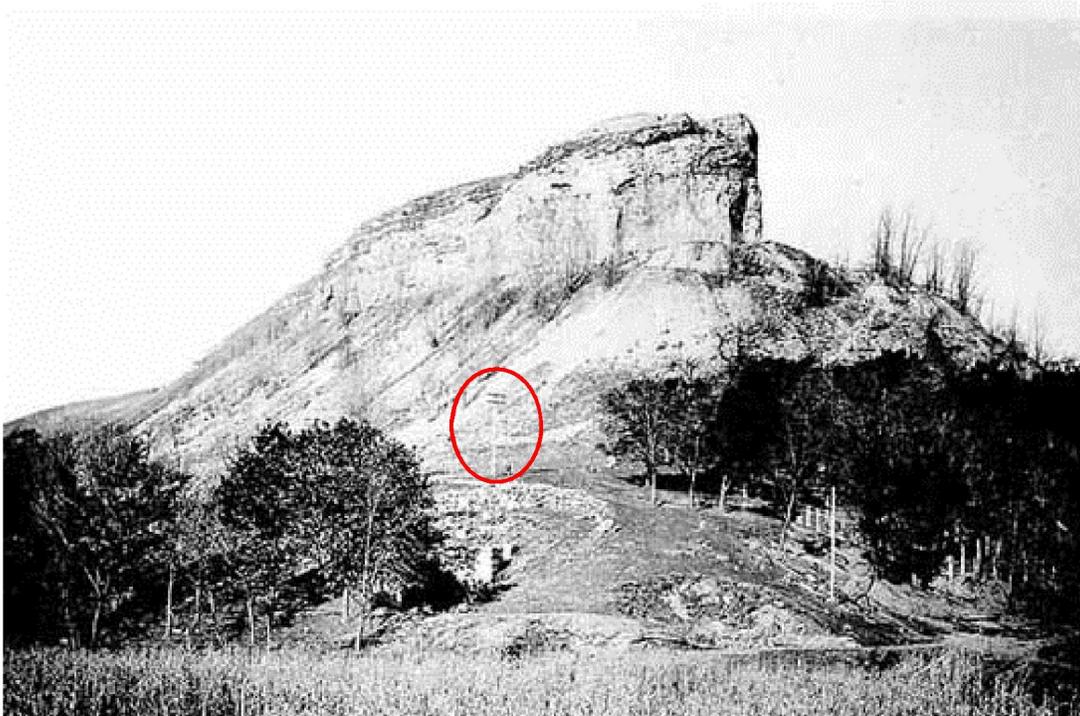
Utility poles are evident in historic images of Barn Bluff dating to the period of significance (Figure 113). It was not determined in the course of this study when these utilities were installed or what industries and structures they served.

Existing Condition

Utility corridors with poles and overhead lines are present on the northeast and southeast corners of Barn Bluff (see Figure 41).

Evaluation: Non-Contributing

Utilities were present on Barn Bluff during the period of significance (1817-1939) on the same portions of the bluff where the present utility corridors are located. However, the utilities are not associated with either of the bluff's areas of historical significance (Exploration/Settlement and Entertainment/Recreation) and therefore do not contribute to the significance of the Barn Bluff National Register Historic District as character-defining small-scale features.



**FIGURE 113. PHOTOGRAPH FROM C. 1895 SHOWING UTILITY POLE (CIRCLED) ON
SOUTHEAST PORTION OF BARN BLUFF**

(MINNESOTA HISTORICAL SOCIETY)

ARCHAEOLOGICAL RESOURCES

Besides the visible cultural features of Barn Bluff, the bluff is known to encompass, and has the potential to yield, sub-surface archaeological resources (Figure 125). To date, a comprehensive archaeological survey of Barn Bluff has not been completed and only limited investigations have been conducted. This section summarizes what is known about archaeological deposits on Barn Bluff and identifies those areas that, based on the history of the property and/or its topography, are archaeologically sensitive.

While the known and anticipated archaeological resources discussed in this section are not associated with either the areas or period of significance of the Barn Bluff National Register Historic District and therefore are unlikely to contribute to its historical significance (as currently defined), these fragile resources are protected by State and Federal laws, as applicable, and are included in this document as they are pertinent to the long-term management of the City's Barn Bluff Park. Furthermore, some of these resources are suitable for inclusion in the park's interpretive plan.

Archaeological resources are to be protected and preserved in place. Subsurface impacts should be avoided in areas of archaeological sensitivity. If ground-disturbing activities are necessary in these areas, archaeological investigations will take place prior to the undertaking. If archaeological resources are identified, and disturbance cannot be avoided, mitigation measures will be undertaken.

Earthworks/Burial Mounds (21GD15)

Historic Condition

It is not known when these features were initially constructed or when they were last used, but burial mounds and earthworks are most often associated with the Woodland through Mississippian periods (1000 B.C.-A.D. 1750). Archaeological evidence indicates that the fertile Mississippi River valley around Red Wing was intensively occupied by Native Americans between A.D. 900-1300,³⁶ and it is likely that the mounds atop Barn Bluff, and the more than 2,000 others in the vicinity, date to this era.³⁷

The Barn Bluff mound group was documented by the 19th-century Northwestern Archaeological Survey. A joint undertaking of Alfred J. Hill and Theodore H. Lewis, this survey sought to document Native American burial mounds and earthworks across Minnesota and the surrounding region. It has been suggested that perhaps it was the year (1854-55) that Hill lived at Red Wing upon first arriving in Minnesota and viewing the area's extensive mound groups that sparked his interest in mapping earthworks.³⁸

In 1885, Lewis mapped three mounds atop Barn Bluff.³⁹ The height and diameter of each mound and its location in relation to the other mounds was recorded at that time. No records of professional archaeological investigations within this mound group exist.

Existing Condition

During field visits for this study, each of the three mounds was relocated.

Mound 1, which is the largest in the group, has the poorest integrity of the three (Figure 114). The high ground afforded by this 6.5-foot tall by 52-foot diameter mound was used as the site of a flagpole installed in 1929 by the American Foreign Legion and a United State Geological Survey geodetic marker established in 1893 (Figure 115). The principal east-west trail across the bluff top passes over the top of this mound and the intense foot traffic has resulted in a worn and eroded paths criss-cross the mound. Based on the exposed aggregate footing of the concrete flagpole base approximately 21 inches of mound fill has eroded since 1929. Also, while recent trail construction avoided the mound itself, it did disturb artifact bearing soils in the vicinity of the mound (Figure 116).



FIGURE 114. ERODED TRAIL ON MOUND 1



FIGURE 115. EROSION AND 1929 FLAGPOLE BASE AND GEODETIC SURVEY MARKER ATOP MOUND 1

Mound 2, which is located to the west of Mound 1 and to the north of the Prairie Trail, displays good integrity. The mound matches its 1885 dimensions and is covered in a well-established grassland.

Mound 3 is located at a distance from the other two mounds near the intersection of the Prairie Trail with the connecting path to the Central Kiwanis Stairway. The integrity of Mound 3 is also good, however it is covered in sumac and erosion from nearby trails could eventually undercut the edges of the mound.



FIGURE 116. RECENT TRAIL CUT NEAR MOUND 1

***Evaluation: Non-Contributing to Barn Bluff Historic District;
Protected by the Private Cemeteries Act (MS 307.08)***

While the burial mounds are located within the boundary of the Barn Bluff National Register Historic District, they predate the established period of significance and the National Register nomination form specifically excludes them from the district.

As mounds are often associated with burials, the Barn Bluff mound group is protected under the Minnesota Private Cemeteries Act (MS 307.08), which affords all human remains and burials of 50 years of age or older that are located outside of platted, recorded, or identified cemeteries protection from unauthorized disturbance. The intentional disturbance of burials or burial areas may be subject to prosecution as a felony or gross misdemeanor under State law.

The Office of the State Archaeologist, the Minnesota Indian Affairs Council, the State Historic Preservation Office, and the Prairie Island Indian Community should be consulted on how best to address the erosion on Mound 1 and consulted prior to any subsurface work atop the bluff in order to ensure their continued preservation and protection.

G. A. Carlson Red Wing Pioneer Lime Works Archaeology Site (21GD297)

Historic Condition

From 1872 until 1908, G. A. Carlson, and subsequent owners, operated a stone quarry and lime manufacturing complex on the east end of Barn Bluff. Carlson's Red Wing Pioneer Lime Works consisted of multiple kilns, together with roadways, quarries on the upper portion of the bluff, a devoted rail spur and other ancillary features.

Existing Condition

The G. A. Carlson Red Wing Pioneer Lime Works site (21GD297) encompasses the 1872 tunnel kiln, the 1882 double-chambered kiln, intact archaeological features (e.g., foundations) and other landscape elements of Carlson's industrial complex located within the boundary Barn Bluff Park (Figure 117). Given that the area has undergone very little activity since the closure of Carlson's enterprise, the site retains good integrity of location, materials, and association. For additional documentation of site 21GD297, see the report on the archaeological investigations prepared in 2014 (Appendix B).⁴⁰

***Evaluation: Non-Contributing to Barn Bluff Historic District (current);
Recommended as Contributing to the G. A. Carlson Lime Kiln
(National Register Listed)***

While dating to Barn Bluff's period of significance, the G. A. Carlson Red Wing Pioneer Lime Works site (21GD297) is not associated with the Barn Bluff Historic District's defined areas of significance (Exploration/Settlement and Recreation/Entertainment). The site is considered historically significant and recommended for incorporation into the G. A. Carlson Lime Kiln's National Register listing. Should the Barn Bluff Historic District's areas of significance be expanded to encompass the stone quarrying and lime manufacturing industries, the features of this site would be recommended as contributing resources to the revised district.

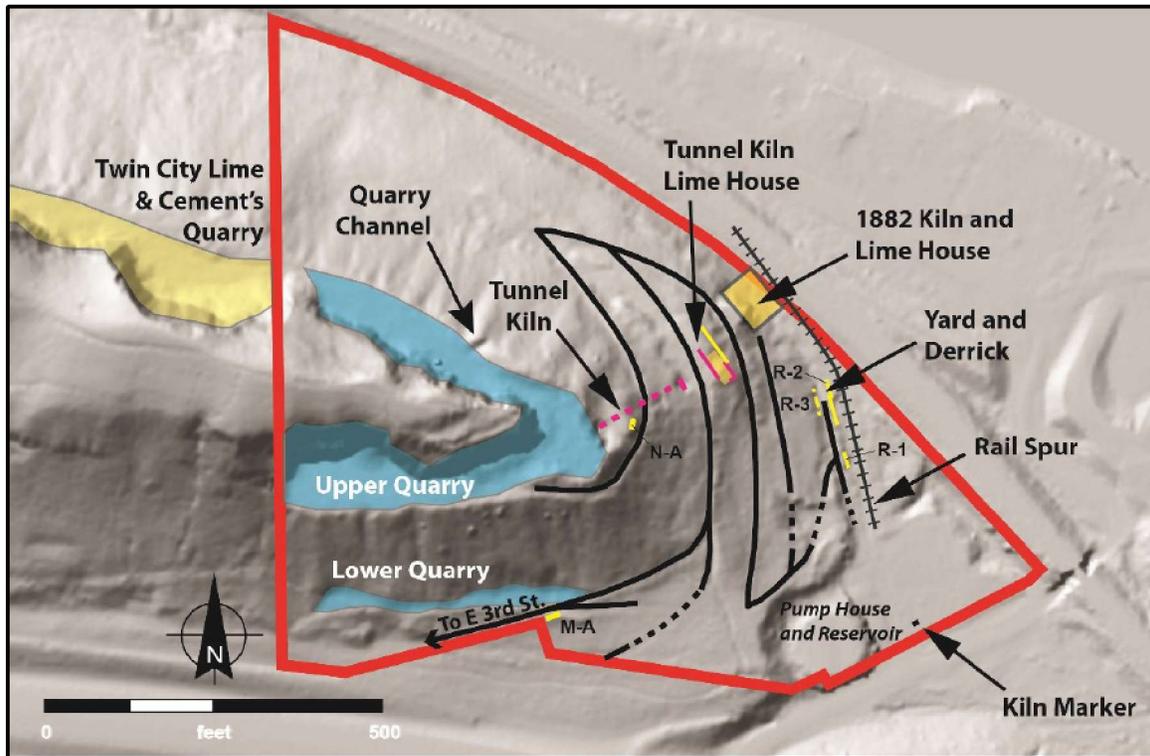


FIGURE 117. G. A. CARLSON'S RED WING PIONEER LIME WORKS ON BARN BLUFF

Site Lead (21GDq)

A site lead is the reported location of a potential archaeological resource that has not been verified by a professional archaeologist. Site leads are assigned letter designations rather than site numbers and are hence commonly referred to as “alpha” sites.

Site 21GDq is the reported find of an early 18th-century long rifle found by William Sweney of Red Wing in 1870.⁴¹ It was discovered at a depth of three feet beneath a large elm tree during the excavation of the railway corridor along the north side of Barn Bluff. The artifact was donated to the Minnesota Historical Society.

The reported location of this find is outside of the boundary of the Barn Bluff Historic District.

Potential Archaeological Resources

In addition to those archaeological resources that have been previously identified, there are portions of the Barn Bluff Historic District that have the potential to contain as yet undocumented archaeological sites. Based on the history of the bluff, archaeological resources that are likely to be present within the district include Native American occupations; sites related to the stone and lime industry; and the former neighborhood along East 3rd Street. Archaeological testing may be needed to identify the extent of these resources and to ensure their avoidance.

Native American Heritage Sites

The presence of Native American mounds atop Barn Bluff and its association with the Dakota village that once stood on the present-day site of Red Wing indicates that the bluff has a high potential to contain as yet unidentified archaeological resources of Native American heritage. These resources are most likely to be present on level terraces and uplands where intact (undisturbed) natural soils are still present. Steep slopes and areas that have been intensively disturbed by the lime manufacturing industry and the development of park features have a low potential to contain intact Native American archaeological features. Limited shovel testing conducted atop Barn Bluff during this study confirmed the presence of a deep, intact soil profile indicating that the bluff's summit is an area of archaeological sensitivity (Figure 125).

Industrial Archaeological Sites

Besides the previously identified archaeological features associated with the G.A. Carlson Red Wing Pioneer Lime Works, the Barn Bluff Historic District has the potential to also contain features related to the stone quarrying and lime manufacturing operations of F. J. Linne and the Twin City Lime and Cement Company (Figure 125).

F. J. Linne Kilns and Quarry. From 1879 through 1890, F. J. Linne operated a twin kiln and quarry on the south side of Barn Bluff (Figure 118).⁴² Stone from the kiln structures was reportedly salvaged during the first decade of the 20th century and the kiln site was further disturbed by the construction of the U.S. Route 61/63 highway corridor in the late 1950s.⁴³ However, sections of foundations or walls are still visible on the bluff above the alignment of Sanderson Street (Figure 119), and a road trace leading from the kiln to the quarry can be discerned (Figure 120). Linne's limestone quarry is the most visible and intact portion of his operations (see Figure 94). None of these features have been evaluated and it is not known if subsurface features are present in the area.



FIGURE 118. LINNE LIME KILNS, 1893

(MINNESOTA HISTORICAL SOCIETY)

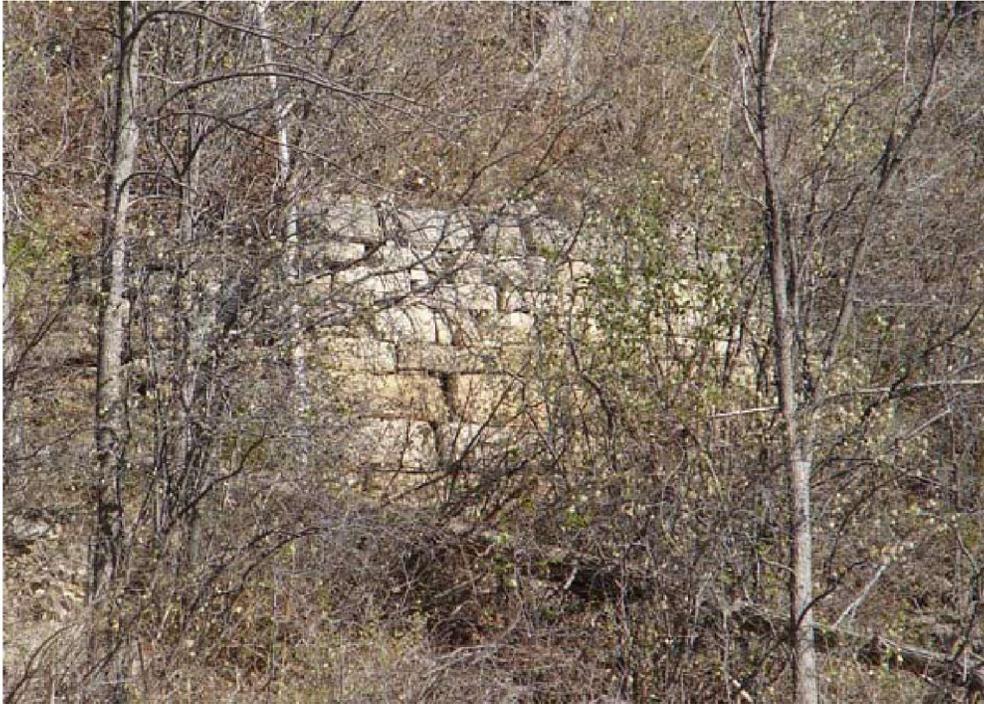


FIGURE 119. RUINS OF LINNE LIME WORKS ON BLUFF EDGE



FIGURE 120. ROAD TRACE BETWEEN LINNE KILN AND QUARRY

Twin City Lime and Cement Company Kilns and Quarry. In 1889, F. J. Linne and business partners took over the operations of kilns and a quarry on the north side of Barn Bluff that had begun production in 1888 (Figure 125).⁴⁴ The unique fire-brick lined, steel-encased kilns were located on a railroad siding at the foot of Barn Bluff, while the quarry was located up slope and immediately to the west of the Carlson quarries (Figure 121). The property line between the two quarries is denoted by a point of unquarried stone. The north side quarry and kilns continued in operation through about 1900.⁴⁵ Due to the steep slope of the north face, stone was transported from the quarry to the kilns below via a rail car system.⁴⁶ Threaded mounts and eye bolts in the quarry mark the location of the rail system's machinery and a scar on the bluff face between this point and the kiln site below likely indicates the route of the trestle (Figure 122). A road trace on the north slope of the Bluff is also likely related to the operations of the Twin City Lime and Cement Company. None of these features have been evaluated and it is not known if subsurface archaeological features are present in the area.



FIGURE 121. TWIN CITY LIME AND CEMENT COMPANY'S KILNS AT THE FOOT OF BARN BLUFF'S NORTH FACE

(GOODHUE COUNTY HISTORICAL SOCIETY)



FIGURE 122. MACHINERY MOUNTS IN TWIN CITY LIME AND CEMENT QUARRY

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

East 3rd Street Residential Neighborhood. The former location of the East 3rd Street residential neighborhood is denoted by a largely level area through which a portion of the South Trail runs (Figures 42, 123 and 125). Features at the rear of the former lots, such as retaining walls, terraces, a cistern, root cellar, and the presence of landscape plants, including lilac bushes and lilies, hint at the presence of the former homes. However, no foundations or slabs are evident indicating that the homes were fully removed at the time of their demolition. The extent of this disturbance was confirmed by limited shovel testing conducted during this study. Shovel tests revealed a shallow and truncated soil profile consistent with an area that has been graded indicating a low potential for intact archaeological resources. While the former East 3rd Street neighborhood is partially located within the boundary of the Barn Bluff Historic District, the lots associated with the homes are located within Minnesota Department of Transportation right of way.

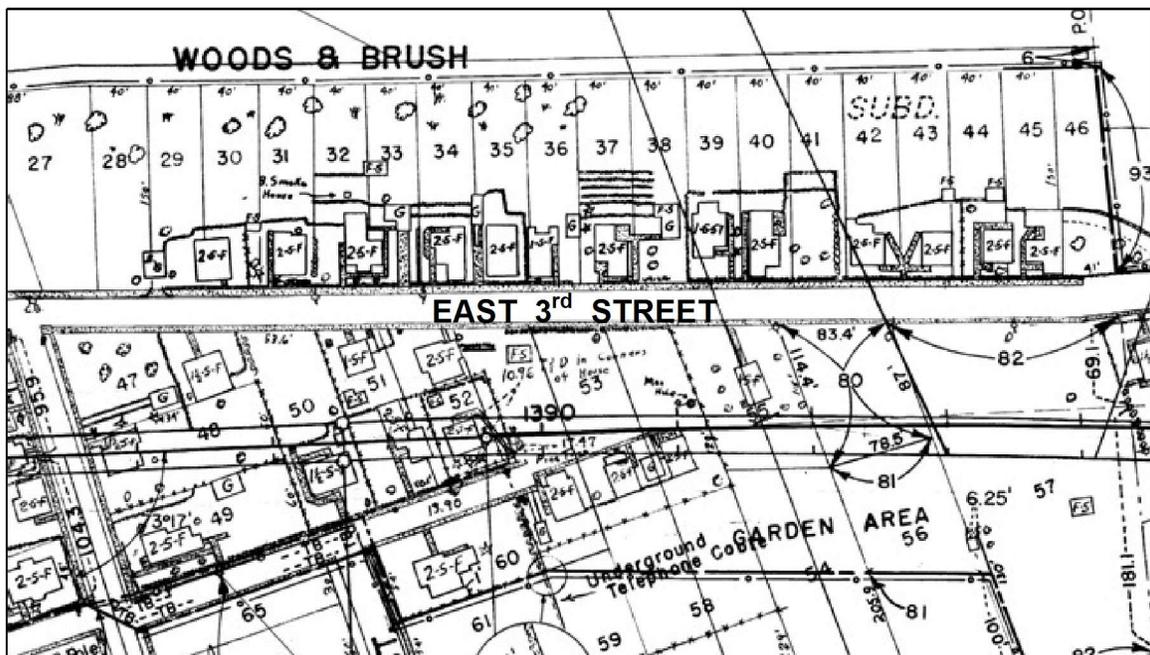


FIGURE 123. DETAIL OF EAST 3RD STREET NEIGHBORHOOD ON 1957 RIGHT OF WAY MAP
(STATE OF MINNESOTA DEPARTMENT OF HIGHWAYS, 1957)

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

TABLE 1. SUMMARY TABLE OF LANDSCAPE FEATURE EVALUATIONS

BARN BLUFF HISTORIC DISTRICT			
<i>Feature</i>	<i>Evaluation</i>	<i>Limestone Industry Features</i>	<i>Notes</i>
Topography	Contributing		
Natural Systems and Features			
Geology and Geomorphology	Contributing		
East Overlook	Contributing		Natural rock outcrop
“Indian Head”	Destroyed		Removed for Hwy 63 bridge, 1958-60
West Overlook (natural)	Destroyed		Removed for Hwy 63 bridge, 1958-60
Views and Vistas			
Mississippi River and Red Wing	Contributing		Panoramic view from east end of bluff.
Mississippi River and Lake Pepin	Contributing		Panoramic view from west end of bluff
Spatial Organization	Contributing		
Land Use			
Natural Resources	Contributing		
Tourism/Recreation	Contributing		
Industrial	Non-contributing	X	
Residential	Non-contributing		
Interpretation	Non-contributing		
Public Utilities	Non-contributing		
Circulation			
Citizen’s Memorial Stairway (West Kiwanis Stairway)	Contributing		Built 1929, partially destroyed 1958-60
East Kiwanis Stairway	Contributing		Built 1976 with steps from 1929 stairway
Central Kiwanis Stairway	Contributing		Built 1982, incorporates steps from 1929
Prairie Trail	Contributing		Pre-1900
Midland Trail	Contributing	X	Pre-1900
East Overlook – East 3rd Street Trail	Contributing		Pre-1938
North Trail	Contributing	X	Pre-1929, partly follows quarry roads
South Trail	Non-contributing		Post 1960
Prairie-South Trail Connector	Non-contributing		Post 1982
G. A. Carlson Lime Kiln Trail	Non-contributing	X	Rail spur, contributing to 21GD297
Road Traces	Non-contributing	X	Those related to the G. A. Carlson lime works contribute to 21GD297
Vegetation			
Prairie	Contributing		
Oak Savanna	Contributing		

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

BARN BLUFF HISTORIC DISTRICT			
<i>Feature</i>	<i>Evaluation</i>	<i>Limestone Industry Features</i>	<i>Notes</i>
Deciduous Forest	Contributing		
Ornamental Plants	Non-contributing		Lilacs and day lilies are examples
Invasive Species	Non-contributing		Buckthorn is an example
Structures			
G. A. Carlson Lime Kiln	Non-contributing (NRHP Listed)	X	Built 1882, National Register listed
Tunnel Kiln	Non-contributing	X	Began operation in 1872
City Water Department Pump House No. 2 and Reservoir	Non-contributing (NRHP Eligible)		Pre-1938, recommended eligible for the National Register
Kiosk/Shelter and Benches	Non-contributing		Built 2003; Benches c. 1976
West Overlook	Non-contributing		Built 2014
Small-Scale Features			
Flagpole Base	Contributing		Installed 1929
Flagpole	Non-contributing		Erected 2011
Limestone Walls (Kiln/Quarry)	Non-contributing	X	Contributing to 21GD297
East 3rd Street Residential Features	Non-contributing		Occupied late 19 th century – c. 1959
National Geodetic Survey Marker	Non-contributing		Established 1893, reset 1990
Interpretive and Directional Signage	Non-contributing		Post 1976
Utility Corridors	Non-contributing		
Quarries			
G. A. Carlson Quarry	Non-contributing	X	Commenced quarrying c.1870, Contributing to 21GD297
F. J. Linne Quarry	Unevaluated	X	Commenced quarrying c.1879
Twin City Lime and Cement Quarry	Unevaluated	X	Commenced quarrying 1880
Archaeological Resources			
Earthworks/Burial Mounds (21GD15)	Non-contributing (Protected)		Three earthworks recorded in 1885
G.A. Carlson Red Wing Pioneer Lime Works (21GD297)	Non-contributing (NRHP Eligible)	X	Archaeological features associated with National Register-listed G. A. Carlson Lime Kiln (1882) and associated works
21GDq (Found Object)	Non-contributing		Long rifle discovered in 1870
Potential Archaeological Resources			
Native American Heritage Sites			Moderate to high archaeological potential
F. J. Linne Lime Works		X	Moderate archaeological potential
Twin City Lime and Cement Co.		X	Moderate archaeological potential
East 3rd Street Neighborhood		X	Low archaeological potential

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

Endnote

- ¹ Carole Zellie, *From Palisade Head to Sugar Loaf: An Inventory of Minnesota's Geographic Features of Historic and Cultural Significance* (St. Paul: Landscape Research, 1989a).
- ² Carol Zellie, "National Register Nomination Form: Barn Bluff" (St. Paul, Minnesota: On file at the Minnesota State Historic Preservation Office, 1989b).
- ³ Minnesota Federal Writers' Project, *Minnesota, a State Guide* (New York: Viking Press, 1938), 300.
- ⁴ "The Evolution of the Conservation Movement, 1850-1920," The Library of Congress – American Memory, Last Updated May 3, 2002. <http://memory.loc.gov/ammem/amrvhtml/conshome.html>
- ⁵ "Cultural Landscape Research," National Park Service, Last updated July 3, 2012. http://www.nps.gov/cultural_landscapes/Research.html
- ⁶ Zellie, 1989b.
- ⁷ Page, et al., 1998:53, 149.
- ⁸ Page, et al., 1998:53, 142.
- ⁹ Curtiss-Wedge, 1909:583.
- ¹⁰ Page, et al., 1998:53, 150.
- ¹¹ *Ibid.*, 324-325.
- ¹² *Ibid.*, 324-325.
- ¹³ Page, et al., 1998:53, 147.
- ¹⁴ Stephen H. Long, *The Northern Expeditions of Stephen H. Long: The Journals of 1817 and 1823 and Related Documents*, ed. L. M. Kane, J. D. Holmquist, and C. Gilman (St. Paul: Minnesota Historical Society Press, 1978 [1823]), 78-79.
- ¹⁵ Page, et al., 1998:53, 140.
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- ³⁵ A photo illustrating a blog entry dated September 9, 2010 includes the plaque (http://www.berryvox.com/2010_09_01_archive.html), while a hiker's photo taken on October 2, 2011 shows the plaque missing (http://www.everytrail.com/browse.php?activity_id=5&city=Red+Wing&country=United+States&state=Minnesota)
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BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

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⁴³ Eide, n.d.:10, 25.

⁴⁴ Joseph W. Hancock, "City of Red Wing," *Saturday Evening Spectator*, September 22, 1888; Hancock 1893:221; Curtiss-Wedge, 1909:635; Eide, n.d.:21.

⁴⁵ Eide, n.d.:39

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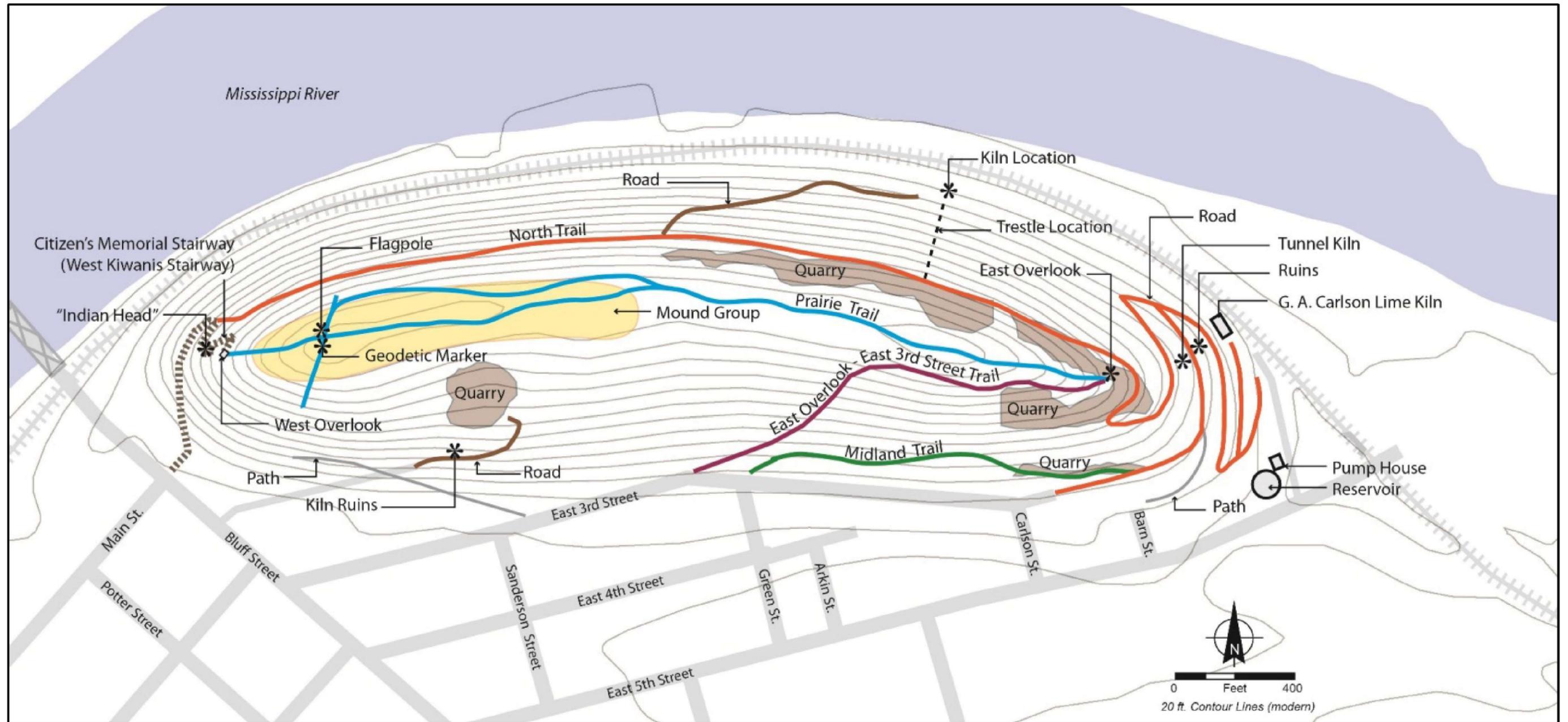


FIGURE 124. BARN BLUFF – 1938 PERIOD PLAN

(Information portrayed is based on available 1938 aerial photographs and documentation of elements known to be present in that year)

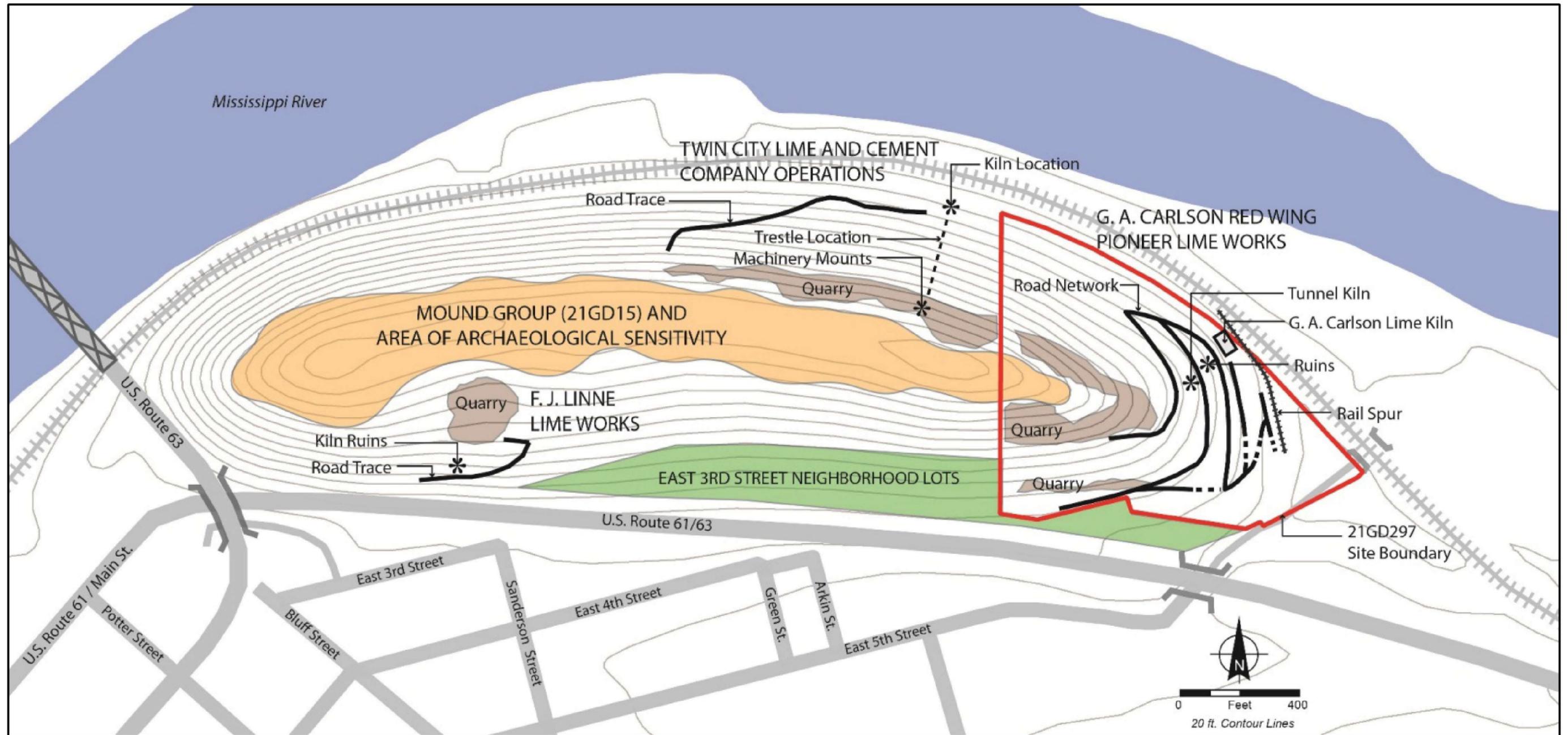


FIGURE 125. BARN BLUFF – IDENTIFIED AND POTENTIAL ARCHAEOLOGICAL RESOURCES

CHAPTER 5 . PRESERVATION APPROACH

This Cultural Landscape Report has been prepared to ensure that the City of Red Wing's management of Barn Bluff Park will continue to preserve and protect the irreplaceable features and characteristics that make this one of the Minnesota's significant historical places. This chapter outlines a preservation approach to serve as a basis for future planning.

PRESERVATION TREATMENT STRATEGIES

The Secretary of the Interior has identified four preservation treatment strategies for historic properties, which are described in *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (National Park Service 1995). The application of these treatment strategies to cultural landscapes are further detailed in *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (Birnbaum and Peters 1996). The four preservation treatment strategies outlined in these guidelines are listed below.

It should be noted that the selection of a preservation treatment strategy for Barn Bluff, does not preclude the use of any of the other approaches to individual landscape characteristics as appropriate. The categories are not exclusionary, but may be used in tandem to best meet the preservation needs of the resources. The preservation treatment strategies are arranged from the least intrusive to the most intensive based on the integrity and amount of original historic characteristics and features present.

For the Barn Bluff Historic District, preservation is the recommended treatment strategy.

PRESERVATION

Preservation requires retention of the greatest amount of historic fabric, including the landscape's historic form, features, and details as they have evolved over time.

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. In a preservation approach, the options for replacement and new additions are limited. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction.

When the property's distinctive materials, features, and spaces are essentially intact and thus convey the historic significance without extensive repair or replacement; when depiction at a particular period of time is not appropriate; and when a continuing or new use does not require additions or extensive alterations, preservation may be considered as a treatment. Prior to undertaking work, a documentation plan for Preservation should be developed.

REHABILITATION

Rehabilitation acknowledges the need to alter or add to a cultural landscape to meet continuing or new uses while retaining the landscape's historic character.

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

When repair and replacement of deteriorated features are necessary; when alterations or additions to the property are planned for a new or continued use; and when its depiction at a particular period of time is not appropriate, Rehabilitation may be considered as a treatment. Prior to undertaking work, a documentation plan for Rehabilitation should be developed.

RESTORATION

Restoration allows for the depiction of a landscape at a particular time in its history by preserving materials from the period of significance and removing materials from other periods.

Restoration is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period.

When the property's design, architectural, or historical significance during a particular period of time outweighs the potential loss of extant materials, features, spaces, and finishes that characterize other historical periods; when there is substantial physical and documentary evidence for the work; and when contemporary alterations and additions are not planned, Restoration may be considered as a treatment. Prior to undertaking work, a particular period of time, i.e., the restoration period, should be selected and justified, and a documentation plan for Restoration developed.

RECONSTRUCTION

Reconstruction establishes a framework for re-creating a vanished or non-surviving landscape with new materials, primarily for interpretive purposes.

Reconstruction is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

When a contemporary depiction is required to understand and interpret a property's historic value (including the re-creation of missing components in a historic district or site); when no other property with the same associative value has survived; and when sufficient historical documentation exists to ensure an accurate reproduction, Reconstruction may be considered as a treatment. Prior to undertaking work, a documentation plan for Reconstruction should be developed.

PRESERVATION TREATMENT STRATEGY CONSIDERATIONS

In choosing the most appropriate preservation approach to the Barn Bluff Historic District, a number of practical and philosophical variables need to be considered including, but not limited to, the property's planned use, the extent of historic documentation available, existing physical conditions, short and long-term objectives, and operating and maintenance costs. The impact of the treatment on any significant archaeological and natural resources should also be considered in this decision making process.

In addition, per the *Guidelines for the Treatment of Cultural Landscapes*, all of the following factors are also to be considered in the selection of an appropriate treatment strategy, not just for the property overall, but each time an action, either large and small, is considered that will affect the resource.

Change and Continuity. A balance is to be struck between change and continuity in the landscape. While both natural processes and human activities result in often unavoidable change in the landscape, efforts should be made to acknowledge change while emphasizing the retention of distinctive landscape characteristics.

Geographical Context. How the surroundings of a cultural landscape contribute to its significance and its historic character should be considered prior to treatment. This consideration is particularly relevant to the Barn Bluff Historic District where views from the bluff top and views of the bluff from downtown Red Wing, together with the relationship of both the bluff and the city to the Mississippi River are significant aspects of the property.

Use. Historic, current, and proposed use of the cultural landscape must be considered prior to treatment selection. Historic use is directly linked to the property's significance while current and proposed use(s) may affect integrity and existing conditions.

Archaeological Resources. The appropriate treatment of a cultural landscape includes the identification and preservation of significant archaeological resources. Sites not only have historical value in their own right, but can reveal important information about a cultural landscape and its development.

Natural Systems. Cultural landscapes often derive their character from a human response to natural features and systems, which is particularly true of Barn Bluff as a natural landform that is significant for its cultural associations. In selecting an appropriate treatment, the impact on the natural systems of the bluff must be considered.

Management and Maintenance. Long-term management strategies and maintenance tasks, when well-planned can sustain the character and integrity of a property over an extended period. Care should be taken to not minimize routine maintenance activities, such as trail upkeep or landscape plan implementation, that over time may have a cumulative impact on the historic character of the property.

Interpretation. The interpretation of a property allows visitors to understand and “read” the cultural landscape. Given the variety of resources present on Barn Bluff from differing time periods and in various states of preservation, the property would benefit from a multi-faceted interpretive plan. Interpretive goals should compliment treatment selection, reflecting the landscape’s significance and historic character.

Special Requirements. Work that must be done to meet accessibility, health and safety, environmental protection, and energy efficiency requirements are often considered separately from a property’s preservation plan, but in assessing the potential impact of these undertakings on the cultural landscape solutions should be sought that achieve the goal of the requirement with the lowest level of impact on the landscape’s historical integrity.

BARN BLUFF PRESERVATION TREATMENT APPROACH

The Barn Bluff Historic District is encompassed by a city park that is utilized primarily by hikers, nature enthusiasts, and rock climbers. It is the objective of the City of Red Wing to facilitate the continued use of the park in the same manner while rehabilitating the native landscape, conserving natural habitat, and preserving the historic features and characteristics of the bluff.

Of the four preservation treatment approaches (preservation, rehabilitation, restoration, and reconstruction), Preservation is recommended as the most appropriate approach within the Barn Bluff Historic District as the planned use is a continuation of the historic use, the bluff retains excellent integrity of its principal historic characteristics, and no major alterations or additions to the property are anticipated.

The implementation of a Preservation treatment approach will ensure that future undertakings within the Barn Bluff Historic District will meet the Preservation guidelines below as outlined in the *Guidelines for the Treatment of Cultural Landscapes*. It should be noted that the selection of Preservation as the guiding tenant for preservation on Barn Bluff, does not preclude the use of rehabilitation, restoration, and reconstruction approaches to individual landscape characteristics as long as all work is in keeping with the Preservation guidelines.

1. The Barn Bluff Historic District will be used as it was historically. Any new use will maximize retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
2. The historic character of Barn Bluff will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize the bluff will be avoided.

3. The Barn Bluff Historic District and its components will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4. Changes to Barn Bluff that have acquired historic significance in their own right shall be retained and preserved (e.g., G. A. Carlson's Red Wing Pioneer Lime Works).
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize the Barn Bluff Historic District will be preserved.
6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration necessitates repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color, and texture.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archaeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

For specific information on the implementation of these standards with regard to landscape characteristics (e.g., vegetation, circulation, and structures) see the "Guidelines for Rehabilitating Cultural Landscapes" (<http://www.nps.gov/TPS/standards/four-treatments/landscape-guidelines/preserve/approach.htm>) within *Guidelines for the Treatment of Cultural Landscapes*.

PRESERVATION PRIORITIES AND RECOMMENDATIONS

In the course of preparing this Cultural Landscape Report, the following items were noted for immediate consideration and/or inclusion in a master plan for Barn Bluff Park.

EROSION AND OFF-TRAIL HIKING

Among the principal threats to historical elements within the Barn Bluff Historic District are erosion and off-trail hiking, which often exacerbates the former. The implementation of methods (e.g., signage and brushing) to deter the use and creation of informal paths and to encourage safe and respectful use of the park is recommended. User groups like Friends of the Bluffs and the Minnesota Climbers Association should be incorporated into the discussion of trail use on the bluff. For guidance on deterring off-trail hiking in sensitive areas see Hockett et al. 2010 and the included annotated bibliography of additional studies.¹

CONDITION OF BARN BLUFF MOUND GROUP

Trail usage has resulted in severe erosion atop Mound 1 of the Barn Bluff Mound group while Mounds 2 and 3 are proximate to eroded trails. In consultation with the Office of the State Archaeologist, the Minnesota Indian Affairs Council, the State Historic Preservation Office, and the Prairie Island Indian Community, a management plan should be developed for the mound group that includes (1) deterring foot traffic over Mound 1; (2) restoring the topography of Mound 1 and seeding the area; and (3) regular monitoring of the condition of the mound group.

SOUTH TRAIL – PRAIRIE TRAIL CONNECTOR EROSION

Related to both of the previous preservation priorities is the severe erosion occurring along the South Trail-Prairie Trail Connector. This trail was created by park users as an informal path between the upper landing of the Central Kiwanis Stairway constructed in 1982 and the existing Prairie Trail. The creation of this trail has altered the original alignment of the Prairie Trail and its use and related erosion threaten Mound 3. It is recommended that this trail not be signed and removed from the City's trail map of the park and that other measures be taken to discourage use in its current form including re-establishing the original Prairie Trail route.

DETERIORATION OF CITIZEN'S MEMORIAL STAIRWAY STEPS

Many of the original 1929 steps that have been incorporated into the East (1976) and West (1982) Kiwanis Stairways have begun to deteriorate and are in need of repair and maintenance. Spalling, delamination, and cracking are occurring in response to cyclic freezing and thawing. If this deterioration continues unchecked it will result in the loss of steps. Guidelines for the repair and protection of historic concrete are provided in the National Park Service's *Preservation Brief 15: Preservation of Historic Concrete*.²

NATIONAL REGISTER FORM UPDATE

The National Register Nomination form for the Barn Bluff Historic District should be updated to address errors (e.g., acreage) and to update contributing elements (e.g., 1929 flagpole base). With the State Historic Preservation Office's concurrence, the district's boundaries should also be revised and the areas of significance expanded to include the stone quarrying and lime manufacturing industries (and contributing resources), the history of which is integral to the formation and preservation of Barn Bluff's present cultural landscape.

INTERPRETATION PLAN

Develop a park wide interpretation plan that emphasizes for park users, the direct historical connection between Barn Bluff's past and its current landscape.

ARCHAEOLOGICAL RESOURCES

Archaeological resources are to be protected and preserved in place. Subsurface impacts should be avoided in areas of archaeological sensitivity. If ground-disturbing activities are necessary in these areas, archaeological investigations will take place prior to the undertaking. If archaeological resources are identified, and disturbance cannot be avoided, mitigation measures will be undertaken.

PERMITTING OF CITIZEN ORGANIZATION ACTIVITIES

Throughout its history, the development of Barn Bluff Park has largely been driven by citizen action. Citizen groups continue to undertake maintenance and improvement projects as illustrated by construction in 2014 of a new West Overlook under the guidance of the organization Friends of the Bluffs. While the assistance of these organizations is of great benefit to the City, groups wishing to carry out maintenance and enhancement activities on the bluff should be informed of Barn Bluff's protected National Register status and their actions reviewed and permitted by the City.

Per state law, project plans, like those for the West Overlook and related modifications to the Prairie Trail, are required to be submitted to the State Historic Preservation Office and the Office of the State Archaeologist for review (see Agency Consultation section of this chapter). These undertakings not only potentially impact the Barn Bluff Historic District and archaeological deposits within the park, but also the viewshed of the Red Wing Downtown Historic District and other historic properties.

VISITOR AMENITIES

As the City of Red Wing considers long-term plans for Barn Bluff Park, the triangle of land bordered by East 5th Street, the Carlson Lime Kiln Trail, and the Canadian Pacific Railway's right of way should be considered for visitor amenities as it is located beyond the boundary of the Barn Bluff Historic District, but yet within the park.

AVOIDANCE OF INCOMPATIBLE MATERIALS

Recent projects within the park have introduced Class 5 gravel along portions of the Prairie Trail atop the bluff. Because this surface was not in use on the bluff's historic trails during the period of significance, it is an incompatible material. The use of Class 5 also diminishes the feeling (historic sense) of Barn Bluff. Further use of this and other incompatible materials should be avoided.

AGENCY CONSULTATION

In undertaking any future work within the boundary of the Barn Bluff Historic District or permitting (either formally or informally) activities by philanthropic and service organizations, consultation with the appropriate agencies, as outlined below, is not only mandated, but necessary to ensuring the continued preservation of the City of Red Wing's most iconic landmark.

Per the Minnesota Historic Sites Act (M.S. 138.71-138.75), the City must provide the State Historic Preservation Office with the opportunity to review and comment on development plans for any new resources (e.g., shelters, trails, benches, and signage) or changes to existing features (e.g., stairways, trails, ruins, quarries) within the Barn Bluff Historic District in order to ensure that the undertaking is appropriate and compatible with the historic character of the district.

The state, state departments, agencies, and political subdivisions, including the Board of Regents of the University of Minnesota, have a responsibility to protect the physical features and historic character of properties designated in sections 138.662 and 138.664 or listed on the National Register of Historic Places created by Public Law 89-665.

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

Before carrying out any undertaking that will affect designated or listed properties, or funding or licensing an undertaking by other parties, the state department or agency shall consult with the Minnesota Historical Society pursuant to the society's established procedures to determine appropriate treatments and to seek ways to avoid and mitigate any adverse effects on designated or listed properties.

(M.S. 138.665, subd. 2, ex.)

Likewise, per the Minnesota Field Archaeology Act (MS 138.31-138.42), the City must provide the Office of the State Archaeologist and the State Historic Preservation Office with the opportunity to review and comment on development plans when archaeological sites are known to, or are suspected to, exist within the project area.

When significant archaeological or historic sites are known or, based on scientific investigations, are predicted to exist on public lands or waters, the agency or department controlling said lands or waters shall submit construction or development plans to the state archaeologist and the director of the society for review prior to the time bids are advertised. The state archaeologist and the society shall promptly review such plans and within 30 days of receiving the plans shall make recommendations for the preservation of archaeological or historic sites which may be endangered by construction or development activities. When archaeological or historic sites are related to Indian history or religion, the state archaeologist shall submit the plans to the Indian Affairs Council for the council's review and recommend action.

(M. S. 138.40, subd. 3)

Furthermore the Office of the State Archaeologist is also to be consulted prior to undertaking any work on the bluff top due to the presence of three recorded earthworks/burial mounds atop the bluff, which are protected under the Minnesota Private Cemeteries Act (MS 307.08).

The Department of Natural Resources, the Department of Transportation, and all other state agencies and local governmental units whose activities may be affected, shall cooperate with the state archaeologist and the Indian Affairs Council to carry out the provisions of this section.

(M.S. 307.08, subd. 9)

Endnotes

¹ Karen Hockett, Amanda Clark, Yu-Fai Leung, Jeffrey L. Marion, and Logan Park, *Deterring Off-Trail Hiking in Protected Natural Areas: Evaluating Options with Surveys and Unobtrusive Observation*, http://www.pwrc.usgs.gov/prodabs/pubpdfs/7495_hockett.pdf (Hagerstown, Maryland: Virginia Polytechnic Institute and State University, College of Natural Resources, Forestry/Recreation Resources, 2010).

² Paul Gaudette and Deborah Slaton, *Preservation Brief 15: Preservation of Historic Concrete*, <http://www.nps.gov/tps/how-to-preserve/briefs/15-concrete.htm#repair> (Washington, D.C.: U.S. Department of the Interior, National Park Service, 2007).

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Part of Main Street and Barn Bluff, Red Wing, c. 1875

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BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

APPENDIX A

**NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM**

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

11605

United States Department of the Interior
National Park Service

RECEIVED

JUL 05 1990

NATIONAL REGISTER

National Register of Historic Places
Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in Guidelines for Completing National Register Forms (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name Barn Bluff
other names/site number LaGrange

2. Location

street & number off U.S. Highway 61 not for publication
city, town Red Wing vicinity
state Minnesota code MN county Goodhue code 049 zip code 55066

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
<input type="checkbox"/> private	<input type="checkbox"/> building(s)		<u> </u> buildings
<input checked="" type="checkbox"/> public-local	<input checked="" type="checkbox"/> district	<u> 1 </u>	<u> </u> sites
<input type="checkbox"/> public-State	<input type="checkbox"/> site	<u> 1 </u>	<u> 3 </u> structures
<input type="checkbox"/> public-Federal	<input type="checkbox"/> structure	<u> </u>	<u> 3 </u> objects
	<input type="checkbox"/> object	<u> 2 </u>	<u> 6 </u> Total

Name of related multiple property listing: N/A
Number of contributing resources previously listed in the National Register 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of certifying official Ian R. Stewart Date 6/27/90
Deputy State Historic Preservation Officer
State or Federal agency and bureau Minnesota Historical Society

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of commenting or other official _____ Date _____
State or Federal agency and bureau _____

5. National Park Service Certification

I, hereby, certify that this property is:

entered in the National Register. Mark Z. Beher Entered in the National Register August 3, 1990
 See continuation sheet.

determined eligible for the National Register. See continuation sheet.

determined not eligible for the National Register.

removed from the National Register.

other, (explain:)

Signature of the Keeper

Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)

Landscape: Natural Feature

Current Functions (enter categories from instructions)

Landscape: Natural Feature

Landscape: Park

7. Description

Architectural Classification

(enter categories from instructions)

N/A

Materials (enter categories from instructions)

foundation N/A

walls

roof

other

Describe present and historic physical appearance.

Barn Bluff, also known as La Grange, is a lone, level-crested bluff which rises about 343 feet above the Mississippi River in Red Wing, the seat of Goodhue County. The south slope is cut by a fault in Paleozoic rock, which is displaced about 150 feet lower than those of surrounding strata. There are exposures of Franconia Green sandstone, St. Lawrence dolomite and shale, Jordan sandstone and Oneota dolomite, all topped by 65 feet of glacial drift. The siltstones contain trilobites and other marine fossils. Thousands of years ago, it was an island in a much larger, post-glacial river. As the water receded, the islands were left as bluffs. A number of geologists have noted how several hundred years of geological time¹ are observable in Barn Bluff's 300-foot cross section of rock.

Although Barn Bluff is located in an area of dramatic river topography which extends from Red Wing to LaCrescent, Minnesota, its orientation to the river is particularly striking. Seen from downriver, it appears almost to stand alone in the river above Colvill Bay. The summit provides expansive views of the bluffs along both sides of the Mississippi and of Red Wing below.

Highway 61 runs along the western edge of the bluff and a large road cut is evident at its southern and western edges. The integrity of the feature, however, is not greatly diminished by these cuts or by the highway bridge at Barn Bluff's northern tip. Railroad tracks run along the base at the river's edge.

A winding stair, consisting of approximately 100 concrete steps beginning near Fifth Street, provides access to the summit. Because of the history of the stair, it is a contributing structure. Three interpretive signs, non-contributing objects, are located at the base of the feature.

Three tumuli mounds have been noted by recent researchers but their significance is not known (GD-15). While non-contributing resources in this nomination, they may be contributing resources when evaluated in other contexts.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

nationally statewide locally

Applicable National Register Criteria A B C D

Criteria Considerations (Exceptions) A B C D E F G

Areas of Significance (enter categories from instructions)

Exploration/Settlement

Entertainment/Recreation

Significant Person

N/A

Period of Significance

1817-1939

Significant Dates

1817

Cultural Affiliation

N/A

Architect/Builder

N/A

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

See continuation sheet.

See continuation sheet

9. Major Bibliographical References

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See continuation sheet

Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey # _____
- recorded by Historic American Engineering Record # _____

Primary location of additional data:

- State historic preservation office
- Other State agency
- Federal agency
- Local government
- University
- Other

Specify repository: _____

10. Geographical Data

Acreage of property 108 acres

UTM References

A

1	5	
5	31711210	
4	9350210	
Zone	Easting	Northing

C

1	5	
5	317900	
4	935150	
Zone	Easting	Northing

B

1	5	
5	3174210	
4	9351410	
Zone	Easting	Northing

D

1	5	
5	38170	
4	935020	
Zone	Easting	Northing

Quadrangle name: Red Wing 1974
Quadrangle scale: 1: 24,000

See continuation sheet
7,8,10:5

Verbal Boundary Description

The boundary of the nominated property is delineated by the 740-foot contour line on the enclosed USGS map (Red Wing, Minn.-Wis.) and is noted by a series of small arrows. This 740-foot contour line is enclosed in a polygon whose vertices are marked by the UTM reference points on the topographic map.

See continuation sheet

Boundary Justification

The boundary includes the entire parcel that has historically been associated with the property.

See continuation sheet

11. Form Prepared By

name/title Carole Zellie
organization Landscape Research date 5/31/89
street & number 1466 Hythe St. telephone (612) 641-1230
city or town St. Paul state MN zip code 55108

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Barn Bluff, Goodhue County, MN

Section number 8 Page 1

Barn Bluff is one of the best-known natural features along the Mississippi River between LaCrescent and St. Paul. It is significant for its association with the exploration of the Upper Mississippi in the nineteenth century, and for its association with mid-nineteenth through early twentieth-century travel, tourism, and recreation. A many-layered interpretation of the feature is evident in local legend, as well as in published historical and scientific accounts, works of art, and photography.

Barn Bluff in Pre-history and Legend

Hham necha, meaning "hill that appears as if it were in the water" is the Dakota name given to Barn Bluff and its vicinity. At the time of early nineteenth-century exploration by whites, the village of Red Wing, and the Mdewakanton Dakota, was located at present-day Red Wing. Legend states that it was a favorite camping place of Indians because of its abundance of wood and water and its₂ elevation. Fields of corn and squash were tended at its base.² Early white visitors₃ noted several burial mounds on the highest point of Barn Bluff.

Explorers' and Geologists' Studies

French explorers probably conferred the title of LaGrange, but no record exists. The earliest published mention of the site appears to be in Carver's Travels (1778), where he refers to having visited this feature in 1766.⁴ It was a standard point of navigation and of general interest for many white explorers who came up the Mississippi River in the first decades of the nineteenth century. Army officer Stephen H. Long and his geologist, William Keating, ascended the bluff during their exploration of the river in 1817. Long noted the mounds, and his discussion of Barn Bluff and the general geology of the area revealed the prevailing theories of geologists Constantin F. Volney and Samuel Mitchill, who had proposed that the Mississippi watershed was once a lake held in by a chain of mountain dams.

In 1832, Henry R. Schoolcraft called it an "isolated calcareous cliff...one of those monuments resulting from geological denudation."⁶ During geologist George W. Featherstonhaugh's trip down the Mississippi in 1835, he also described La Grange, calling it an "outlier on the right bank of the Mississippi, about three-hundred feet high, which presented a good section of sandstone and limestone."⁷ Nicollet, in 1838, also referred to it as LaGrange.

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation Sheet

Barn Bluff, Goodhue County, MN

Section number 8 Page 2

From early geologist's descriptions, it is evident that the existence of Glacial River Warren--which at one point inundated this area--was not yet fully understood. By the time of the survey of David Dale Owen, published in 1852, and the more exhaustive The Geology of Minnesota (1884), these theories were revised and Barn Bluff was discussed as an outcome of glaciation. Owen called it "a remarkable headland which has the appearance of a hill split down the middle."¹⁰

The geologist's descriptions of the rocks represented in Barn Bluff also reveal changes in geological nomenclature. While modern geologists classify the major rocks as Oneota and St. Lawrence Dolomite and Jordan Sandstone, earlier geologists described primarily the Lower Magnesian Limestone and Sandstone.

Modern geologists often use Barn Bluff to illustrate fault block formations, Paleozoic rocks and erosional processes. It is a standard entry in most Minnesota geology texts, including Bray (1977), Ojakangas and Matsch (1982), and Sansome (1983).¹¹

Barn Bluff in Local Historical Accounts

Geologists were among the first to elaborate on the presence of La Grange or Barn Bluff, but early permanent white settlers at Red Wing also made written record of it. In 1849, the Reverend John Hancock noted that he had "peculiar sensations" at the sight of "that bold bluff standing in the middle of that great valley..."¹²

On the original town plat, the bluff was the terminus of Main Street, and served as a backdrop for the manufacturing and trade center. Beginning in the 1850s, a quarry was worked in the Oneota Dolomite exposed on the south face, and the stone was used in the construction of a number of local buildings including the Episcopal church.

Over the past century and a quarter, the bluff has been hiked by many Red Wing residents as a popular pastime. Two rough paths, likely the remnant of Indian trails and about three feet apart, were in use until 1889, when local resident C.C. Webster directed the construction of an improved approach, known as "Webster's Way." The Citizen's Memorial Stairway, consisting of 472 concrete steps, was built in 1929. Each step was endowed by a local donor. (Only about 100 of the original steps are still in place at the west end of the bluff; bridge construction in 1958

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Barn Bluff, Goodhue County, MN

Section number 8 Page 3
eliminated many.)¹³ In 1910, the land was acquired by the city for
use as a public park.

Barn Bluff and its Scenic and Literary Aspects

Many of those studying the scientific aspects of Barn Bluff were also attracted to its scenic value. Stephen H. Long wrote in his journal of July 18, 1817 that "from the summit of the Grange, the view of the surrounding scenery is surpassed perhaps by very few, if any, of a similar character that the Country and probably the world can afford. The sublime and beautiful are here blended in most enchanting manner, while the prospect has very little to terrify or shock the imagination."¹⁴ His geologist, William H. Keating, used similar language in describing it. Most geologists remarked at some length about the scenic views possible from this site.

Among the others who came here seeking vistas and aesthetic experience were those on the "Fashionable Tour" of the upper Mississippi. Beginning the 1830s and in some number in the 1840s, they disembarked from steamboats, and later, railroad cars, at this site.¹⁵ Mixed in with the scenery seekers were artists and panoramists such as Henry Lewis, who spent 1848 touring the river and painting sites such as Barn Bluff. Lewis' depiction appears in a painting titled "Red Wing's Village" and in his sketchbooks.¹⁶ There are a variety of landscape paintings and engraved views by a number of artists from the period 1850-1880.

Among the best known of the early tourists was Henry David Thoreau, who sat atop the bluff in 1861, just one year before his death. He noted the botanical, rather than geological aspects of the site.¹⁷ Barn Bluff appears to have been a favorite subject of local poets. Red Wing resident Charles P. Hall wrote--apparently in the 1930s--that "it is the Gibraltar of our city."¹⁸

Barn Bluff was a standard point of interest for early automobile travelers along both sides of the Mississippi. The 1938 WPA Guide to Minnesota was among several tour guides of the pre-World War II period which featured this site as part of a river trip.

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Barn Bluff, Goodhue County, MN

Section number 7,8 Page 4

NOTES

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United States Department of the Interior
National Park Service

**National Register of Historic Places
Continuation Sheet**

Barn Bluff, Goodhue County, MN

Section number 7,8,10 Page 5

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17. The First and Last Journeys of Thoreau. Boston: The
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18. "Barn Bluff" by Charles P. Hall in C.A. Rasmussen, A History
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GEOGRAPHICAL DATA

UTM References (Continued):

E: 15 538120 4934890

F: 15 537250 4934910

APPENDIX B

**G. A. CARLSON LIME KILN
ARCHAEOLOGICAL REPORT**

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

**ARCHAEOLOGICAL INVESTIGATION
OF THE G. A. CARLSON
RED WING PIONEER LIME WORKS (21GD0297),
CITY OF RED WING,
GOODHUE COUNTY, MINNESOTA**



G. A. Carlson Lime Kiln, c. 1890
(Goodhue County Historical Society)

Prepared for:
City of Red Wing – Planning Department

Prepared by:
Two Pines Resource Group, LLC



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FINAL
September 2014

**ARCHAEOLOGICAL INVESTIGATION
OF THE G. A. CARLSON LIME KILN (21GD0297),
CITY OF RED WING,
GOODHUE COUNTY, MINNESOTA**

**OSA License No. 14-20
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MANAGEMENT SUMMARY

In June and July of 2014, Two Pines Resource Group, LLC (Two Pines) conducted an intensive literature search and archaeological investigation of the G. A. Carlson Lime Kiln in support of an Historic Structure Report (HSR) being prepared for the kiln. This work was performed for the City of Red Wing (the City), which funded the project in part with a grant from the State of Minnesota's Arts and Cultural Heritage Fund. MacDonald & Mack Architects, the lead consultant, prepared the HSR. Dr. Michelle Terrell of Two Pines served as the archaeological Principal Investigator. Eva Terrell authored the historical contexts specific to the Barn Bluff lime industry to support both studies.

The G. A. Carlson Kiln structure (GD-RWC-20) was listed on the National Register of Historic Places in 1976, but had not previously undergone an archaeological investigation. The purpose of the archaeological study was to define the extent of subsurface features of the associated lime works and to locate archaeological deposits related to the kiln, its workers, and/or functions. The kiln is located on city property within Barn Bluff Park, which is an approximately 43 acre (17.4 hectare) area bound on the west by the TH 63 corridor, on the south by the TH 61/63 corridor, on the east by East 5th Street, and on the north by the Canadian Pacific (CP) Railway right of way. The kiln is located on the northeast corner of the bluff in the in the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 29 of Township 113N, Range 14W. This area is located within the Southeast Riverine - East archaeological sub-region.

The operation of the G. A. Carlson Red Wing Pioneer Lime Works on Barn Bluff consisted of not one, but multiple kilns, together with roadways that connected the kilns to quarries on the upper portion of the bluff, a devoted rail spur and other ancillary features which as a whole formed a single industrial complex. During the current investigations of 21GD0297, intact archaeological features and other landscape elements of this historically-significant industry were documented within that portion of Government Lots 3 and 4 owned by Carlson and located within the boundary Barn Bluff Park. Given that the area has undergone very little activity since the closure of Carlson's enterprise, and principal threats have been limited to erosion, climbing enthusiasts, and disturbance immediate to the CP Railway corridor, the site retains good integrity of location, materials, and association.

Together the documented archaeological and landscape features illustrate the locally-significant lime industry that contributed to Red Wing's commercial growth and which had a literal lasting impact on the city's landscape (Criterion A), as well as provide information important to our understanding of the technology of turning limestone into lime (Criterion D). The National Register listing for the G. A. Carlson Lime Kiln should be updated to reflect these findings including revising the period of significance (1872-1908), broadening the contributing resources, and updating the property's boundary. The 1882 kiln is also presently outside the boundary of the Barn Bluff National Register Historic District. It is recommended that the boundaries of the Barn Bluff Historic District be revised and the areas of significance expanded to include the stone quarrying and lime manufacturing industries, the history of which is integral to the formation and eventual preservation of Barn Bluff's present cultural landscape (Two Pines 2014).

Subsurface impacts within the site boundary should be avoided. If archaeological site 21GD0297 will be impacted by park development plans or kiln stabilization measures, the appropriate level of treatment for the effected cultural resources should be determined in consultation with the State Historic Preservation Office.

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TABLE OF CONTENTS

MANAGEMENT SUMMARY	i
LIST OF FIGURES	iv
INTRODUCTION	1
RESEARCH DESIGN	5
OBJECTIVES	5
METHODS	5
<i>Literature Search</i>	5
<i>Fieldwork</i>	5
<i>Laboratory Analysis and Curation</i>	6
<i>Geographic Information System Data</i>	6
LITERATURE SEARCH	7
NATIONAL REGISTER NOMINATION.....	7
RECORDED ARCHAEOLOGICAL SITES	7
PREVIOUS CULTURAL SURVEYS	7
HISTORIC PHOTOGRAPHS	7
ENVIRONMENTAL HISTORY OVERVIEW.....	12
HISTORICAL CONTEXTS	13
EARLY AGRICULTURE AND RIVER SETTLEMENT, 1840-1870.....	13
RAILROADS AND AGRICULTURAL DEVELOPMENT, 1870-1940.....	15
HISTORICAL NARRATIVE.....	17
<i>The Lime Burning Process</i>	17
<i>The Red Wing Lime Industry</i>	18
<i>G. A. Carlson's Red Wing Pioneer Lime Works on Barn Bluff</i>	19
FIELDWORK RESULTS	23
WORK SUMMARY	23
<i>1882 Kiln (GD-RWC-20)</i>	23
<i>Lime House</i>	32
<i>Tunnel Kiln</i>	34
<i>Tunnel Kiln Lime House</i>	37
<i>Quarries</i>	37
<i>Stone / Lime Yard</i>	42
<i>Spur Track</i>	44
<i>Roads</i>	44
<i>Retaining Walls</i>	46
<i>G. A. Carlson Lime Kiln Interpretive Marker</i>	48
SYNTHESIS	48
<i>Significance</i>	49
<i>Period of Significance</i>	49
<i>Integrity</i>	50
<i>Site Boundaries</i>	50
INTERPRETIVE POTENTIAL.....	51
SUMMARY AND RECOMMENDATIONS	53
REFERENCES CITED	55

LIST OF FIGURES

FIGURE 1.	SITE LOCATION	2
FIGURE 2.	BOUNDARY OF CARLSON'S PIONEER LIME WORKS ON BARN BLUFF (21GD0297), CITY PARCEL MAP (2012 AERIAL)	3
FIGURE 3.	BOUNDARY OF 21GD0297 ON LIDAR IMAGE	3
FIGURE 4.	CARLSON'S BARN BLUFF LIME WORKS, VIEW TO WEST (GOODHUE CO. HIST. SOC. 1.2.4186)	8
FIGURE 5.	STEREOGRAPH OF CARLSON'S LIME KILN AT RED WING BY JOHN P. WEDMARK, VIEW TO SOUTH (MHS NEG. NO. 519).....	9
FIGURE 6.	VIEW OF CARLSON'S 1882 LIME KILN, VIEW TO SOUTH (GOODHUE CO. HIST. SOC. 1.2.4187)	9
FIGURE 7.	RECEIPT FEATURING LITHOGRAPH MADE FROM THE WEDMARK PHOTOGRAPH OF CARLSON'S BARN BLUFF LIME WORKS.....	10
FIGURE 8.	LOWER END OF BARN BLUFF WITH THE KILN COMPLEX AT THE LOWER LEFT, 1900 (MHS NEG. NO. 2903-B).....	10
FIGURE 9.	THE 1882 CARLSON LIME KILN, VIEW TO THE SOUTH-SOUTHWEST (<i>REPUBLICAN EAGLE</i> , 12- 29-1973).....	11
FIGURE 10.	THE 1882 CARLSON LIME KILN, VIEW TO SOUTHWEST, MAY 1975 (MHS NEG. NO. 01221-33)	11
FIGURE 11.	DETAIL OF RED WING FROM THE 1856 GENERAL LAND OFFICE SURVEY MAP	14
FIGURE 12.	ILLUSTRATION OF A LATTER HALF OF THE 19 TH CENTURY LIME KILN (WABASH AND ERIE CANAL PARK [INDIANA] 2009).....	18
FIGURE 13.	G. A. CARLSON'S RED WING PIONEER LIME WORKS ON BARN BLUFF	24
FIGURE 14.	PLAN OF 1882 KILN AND SURROUNDING FOUNDATIONS AND RETAINING WALLS.....	25
FIGURE 15.	THE DOUBLE-CHAMBERED 1882 CARLSON LIME KILN, VIEW TO WEST-SOUTHWEST	26
FIGURE 16.	THE INTERIOR OF THE 1882 KILN'S CENTRAL ARCH	26
FIGURE 17.	THE INTACT DRAWING EYE WITHIN THE WEST DRAW ARCH OF THE 1882 KILN.....	27
FIGURE 18.	THE DRAWING EYE OR REAR WALL OF THE EAST DRAW ARCH HAS FAILED	28
FIGURE 19.	PARTS OF THE 1882 KILN AND THE SURROUNDING LIME HOUSE.....	29
FIGURE 20.	FEATURES OF THE 1882 KILN: SHED OVER THE EXTERIOR WEST FIRE BOX (DETAIL – GOODHUE CO. HIST. SOC. 1.2.4187).....	30
FIGURE 21.	VIEW INTO THE BRICK-LINED INTERIOR OF THE 1882 KILN'S EAST CHAMBER.....	30
FIGURE 22.	VIEW OF THE TOP OF THE 1882 KILN'S WEST CHAMBER.....	31
FIGURE 23.	FEATURES OF THE 1882 KILN: CHARGING PLATFORM AND STOPPING BLOCK (DETAIL – GOODHUE CO. HIST. SOC. 1.2.4187).....	31
FIGURE 24.	LIME WORKS OF THE 1882 KILN (DETAIL – GOODHUE CO. HIST. SOC. 1.2.4187).....	32
FIGURE 25.	FEATURES OF THE 1882 KILN: DEPOT SHED ROOF (DETAIL - GOODHUE CO. HIST. SOC. 1.2.4186).....	33
FIGURE 26.	PRE-1973 IMAGE OF THE 1882 KILN SHOWING THE STONE FIRST STORY OF THE LIME WORKS STILL PARTIALLY EXTANT (OIL CARS ARE PARKED ON LIME KILN SPUR TRACK) (<i>REPUBLICAN EAGLE</i> , 12-29-73)	33
FIGURE 27.	ILLUSTRATION OF LOCATION OF THE LIME WORKS FIRST STORY- SINCE REMOVED (DASHED LINE), VIEW TO NORTHWEST.....	34
FIGURE 28.	PLAN OF 1882 KILN AND TUNNEL KILN FEATURES	35
FIGURE 29.	TUNNEL KILN ENTRANCE	36
FIGURE 30.	TUNNEL KILN ENTRANCE WITH UPSLOPE COLLAPSE INDICATED	36
FIGURE 31.	LOCATION OF TUNNEL KILN AND ASSOCIATED LIME WORKS ON LIDAR IMAGE.....	37
FIGURE 32.	UPPER RETAINING WALL ASSOCIATED WITH THE TUNNEL KILN'S LIME HOUSE, VIEW TO SOUTH	38
FIGURE 33.	DETAIL OF 1900 PHOTOGRAPH SHOWING THE TUNNEL KILN'S LIME HOUSE ABOVE THE 1882 KILN (DASHED OUTLINE)	38
FIGURE 34.	CARLSON QUARRY LOCATIONS ON LIDAR BASE MAP	39
FIGURE 35.	BARN BLUFF'S QUARRIED EAST END, VIEW TO NORTH C. 1895	40
FIGURE 36.	QUARRY WALL AND FLOOR ON NORTH SIDE OF BARN BLUFF	40
FIGURE 37.	CHANNEL LEADING OFF OF NORTH QUARRY, VIEW TO NORTHEAST	41

FIGURE 38.	QUARRY CHANNEL AND SCAR BELOW IT ON LIDAR IMAGE.....	41
FIGURE 39.	STONE / LIME YARD (DETAIL - GOODHUE Co. HIST. SOC. 1.2.4186).....	42
FIGURE 40.	POLE DERRICK WITH BRACING VISIBLE ABOVE RAIL CARS (DETAIL – GOODHUE Co. HIST. SOC. 1.2.4187).....	43
FIGURE 41.	PORTION OF LIMESTONE RETAINING WALL 2 BETWEEN THE RAIL SPUR (FOREGROUND) AND STONE YARD (BACKGROUND), VIEW TO SOUTHWEST.....	43
FIGURE 42.	PORTION OF RETAINING WALL 3, VIEW TO SOUTHWEST.....	44
FIGURE 43.	THE SPUR TRACK ILLUSTRATED ON AN 1894 MAP.....	45
FIGURE 44.	RAIL SPUR ALIGNMENT, VIEW TO SOUTHEAST TOWARDS PUMP HOUSE.....	45
FIGURE 45.	ROADS ASSOCIATED WITH THE CARLSON LIME WORKS ON LIDAR IMAGE.....	46
FIGURE 46.	PORTION OF 20 TH CENTURY RETAINING WALL 1, VIEW TO WEST.....	47
FIGURE 47.	PORTION OF MIDLAND TRAIL RETAINING WALL A, VIEW TO NORTH.....	47
FIGURE 48.	NORTH TRAIL RETAINING WALL A, VIEW TO SOUTHWEST.....	48
FIGURE 49.	G. A. CARLSON LIME KILN INTERPRETIVE MARKER.....	49
FIGURE 50.	BOUNDARY OF SITE 21GD0297 ON CITY PARCEL MAP (2012 AERIAL).....	50

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INTRODUCTION

In June and July of 2014, Two Pines Resource Group, LLC (Two Pines) conducted an intensive literature search and archaeological investigation of the G. A. Carlson Lime Kiln in support of an Historic Structure Report (HSR) being prepared for the kiln. This work was performed for the City of Red Wing, which funded the project in part with a grant from the State of Minnesota's Arts and Cultural Heritage Fund. MacDonald & Mack Architects, the lead consultant, prepared the HSR.

The City of Red Wing intends to stabilize and preserve the Carlson Kiln as part of future park improvements to Barn Bluff Park. In addition to the stabilization of the kiln, potential improvements to the property include additional interpretation of the site, safety enhancements, brush removal and appropriate permanent landscaping. The purpose of the archaeological investigation of the Carlson Kiln was to define the extent of subsurface features of the lime works and to locate archaeological deposits related to the kiln, its workers, and/or functions so that contributing elements can be protected, preserved, and interpreted.

The G. A. Carlson Kiln (GD-RWC-20) is located on city property within Barn Bluff Park, which is an approximately 43 acre (17.4 hectares) area. The kiln is located on the northeast corner of the bluff in the in the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 29 of Township 113N, Range 14W. The central UTM (Zone 15, NAD 83) coordinate for the 1882 kiln structure is 538148E 4935250N. The greater Red Wing Pioneer Lime Works (21GD0297) of which the extant kiln was a part are encompassed by a parcel (PIN 556100080) bound on the north by the right of way (ROW) of the CP Railway; on the east/southeast by the alignment of East 5th Street; on the south/southwest by the ROW of TH 61/63; and on the west by the west line of Government Lot 4 (Figures 1-3). This parcel encompasses the east end of Barn Bluff, the upper portion of which was quarried for stone. The general topography of the parcel is steeply sloped and the kiln complex occupies a series of terraces on the northeast corner of the bluff. The majority of the parcel is wooded with the exception of the prairie atop the bluff, the exposed bedrock of the quarry, and the manicured park to the east/northeast of the Carlson Lime Kiln Trail where an interpretive marker for the kiln is located.

This report presents the objectives, methods, background research, environmental history, fieldwork results, summary, and recommendations for the archaeological investigations.

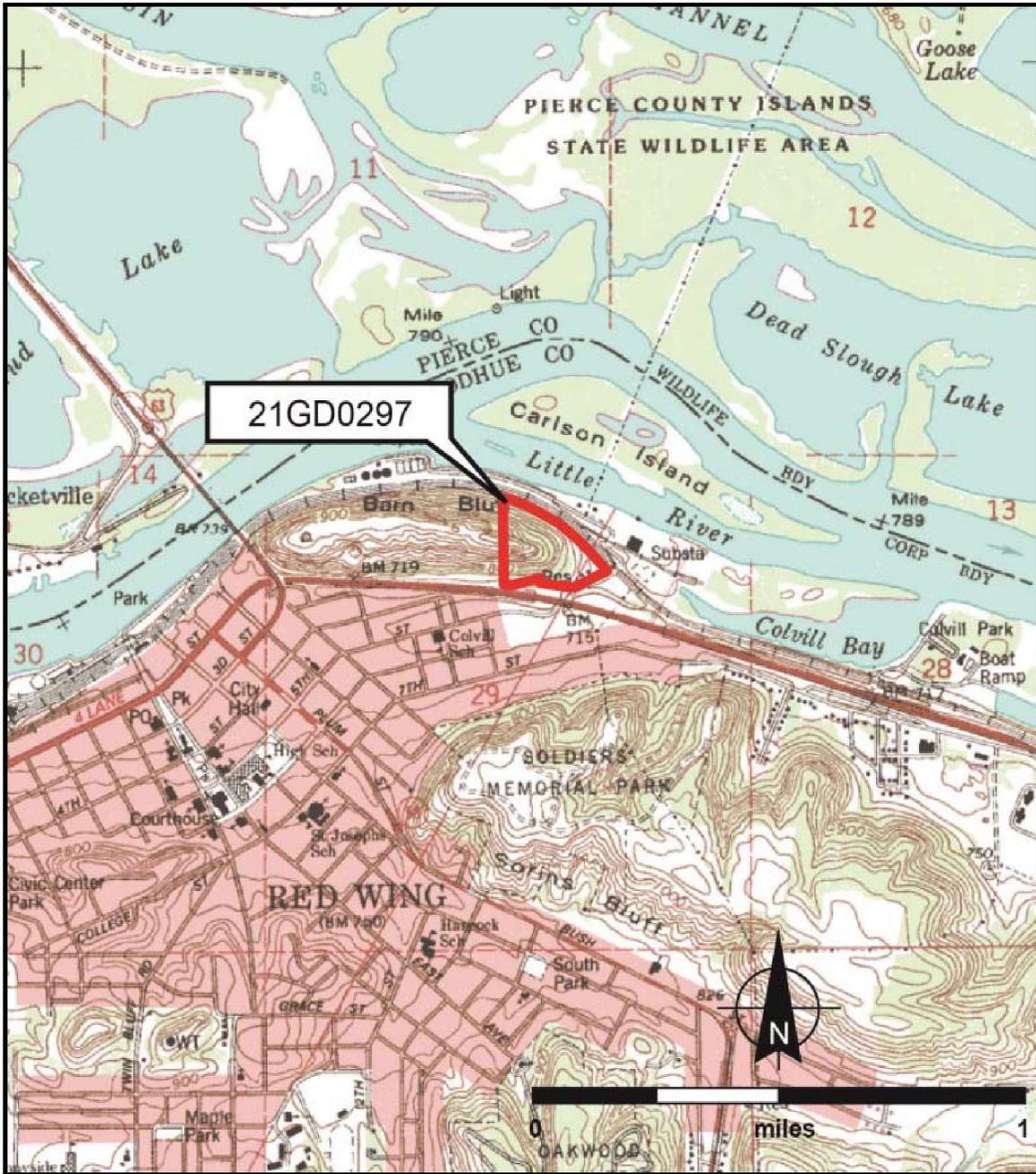


FIGURE 1. SITE LOCATION

(RED WING, 1994, QUADRANGLE, USGS 7.5 MINUTE SERIES)



FIGURE 2. BOUNDARY OF CARLSON'S PIONEER LIME WORKS ON BARN BLUFF (21GD0297), CITY PARCEL MAP (2012 AERIAL)

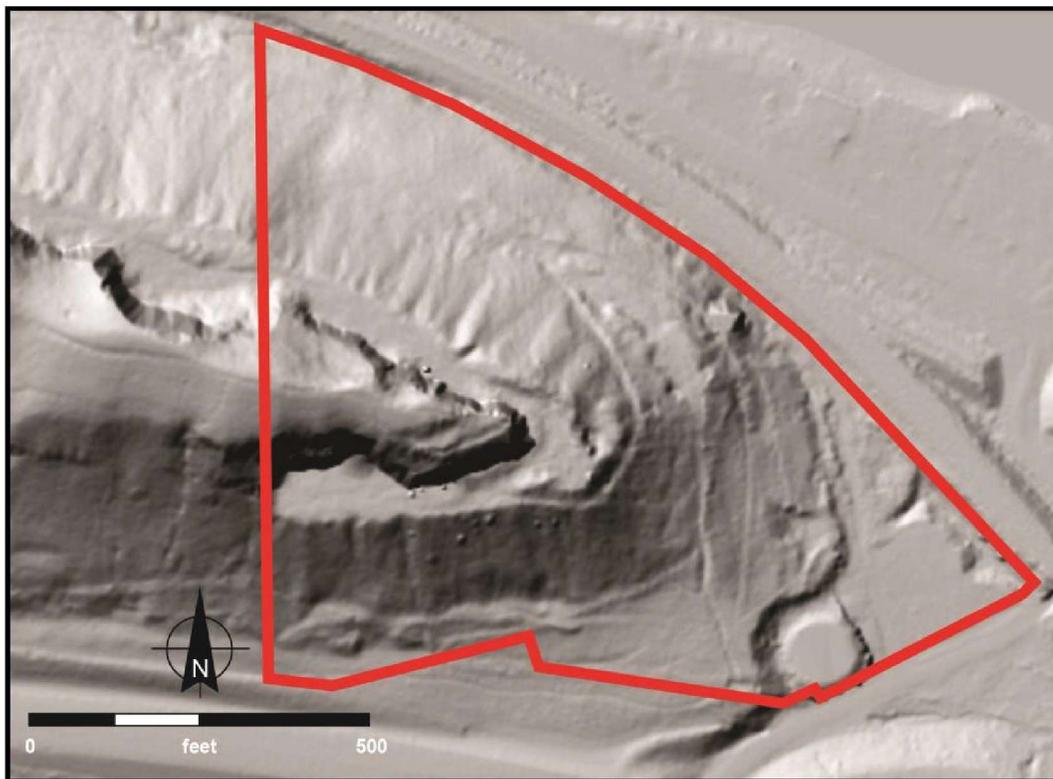


FIGURE 3. BOUNDARY OF 21GD0297 ON LIDAR IMAGE

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RESEARCH DESIGN

OBJECTIVES

The purpose of the archaeological investigations was to define the extent of archaeological features related to the G. A. Carlson Kiln and associated lime works. Due to its location at the extreme east end of Barn Bluff, the location of Carlson's Barn Bluff lime works is not covered by the Sanborn Map Company's fire insurance maps of Red Wing or historical panoramic map views of the city. While a kiln is indicated at the east end of Barn Bluff on W. P. Campbell's 1874 map of Red Wing and both the Tunnel Kiln and 1882 Kiln are present on the 1894 map of the city (Campbell 1874; Foote and Henion 1894), these maps do not show the lime works in any detail. While information on G. A. Carlson and the development of his business are provided in secondary documents on the history of Red Wing and its lime industry, these resources do not provide any specific information on the layout and construction of the standing 1882 kiln and very little detail on the tunnel kiln. For these reasons, an industrial archaeological assessment of the kiln complex was undertaken in order to learn about the layout of the kiln and its operation. This study was also necessary in order to provide the city with a boundary of the kiln complex for future resource management.

METHODS

All work was conducted in accordance with the *SHPO Manual for Archaeological Projects in Minnesota* (Anfinson 2005); the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011), and the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (National Park Service 2002).

Literature Search

During the literature search portion of the project, staff from Two Pines conducted background research within the holdings of the State Historic Preservation Office (MnSHPO), the Minnesota Historical Society (MHS), the University of Minnesota Borchert Map Library, the Red Wing Public Library, the Library of Congress on-line database, the Goodhue County Historical Society, and other online archives. The purpose of this research was to gather information on the history of the G. A. Carlson Kiln and lime production in Red Wing. This research included an examination of previous survey reports, historical maps and atlases, photographs and images, local histories, newspaper archives, and other documents.

Fieldwork

Archaeological investigation of the Carlson Kiln and associated lime works consisted of an intensive pedestrian survey, followed by the mapping and photographing of structures, foundations, retaining walls, depressions, and roads. Due to the susceptibility of the bluff face and the archaeological features to erosion and the fact that no disturbance was imminently planned that would necessitate further delineation of features, clearing was limited to that amount necessary to visualize or confirm potential or existing foundation

alignments and other features. Data gathered during the survey were recorded on field forms and in the field notebook of the Principal Investigator.

Laboratory Analysis and Curation

No artifacts were collected during the course of these investigations.

Geographic Information System Data

A geographic information system (GIS) data layer was created during the course of the archaeological investigations. The locations of all individual shovel tests and surface finds were recorded using a Trimble GeoXT[®] GPS Unit. The data were differentially corrected using a National Geodetic Survey (NGS) continuously operating reference station (CORS).

LITERATURE SEARCH

Prior to fieldwork, staff from Two Pines conducted background research at the MnSHPO. The focus of this research was to determine what information had been gathered on the kiln in the course of previous studies.

NATIONAL REGISTER NOMINATION

In 1975, G. J. Kunau, chairman of the City of Red Wing's Planning Commission, completed a National Register of Historic Places nomination for the G. A. Carlson Lime Kiln (GD-RWC-20) that resulted in the kiln's listing on September 27, 1976. Typical of the period, this nomination provides a limited physical description of the kiln and its history. While the nomination encompasses a 0.5-acre area and mentions the tunnel kiln "at the back edge of the property," it is principally for the extant 1882 structure and does not address related features or archaeological resources. The kiln was recognized as a structure of local significance that meets National Register Criteria A and C in the areas of commerce, engineering, and industry.

RECORDED ARCHAEOLOGICAL SITES

Background research conducted at the SHPO revealed that the boundary of one previously identified archaeological site overlaps with the kiln study area. The boundary of 21GD0015 (Barn Bluff Mounds) is drawn to encompass all of Barn Bluff, however, the three earthworks recorded within this mound group are located atop the western half of the bluff at a distance of more than 0.25 miles from the kiln.

A site lead, 21GDq, has also been recorded in the vicinity of the kiln. A site lead is the reported location of a potential archaeological resource that has not been verified by a professional archaeologist. Site leads are assigned letter designations rather than site numbers and are hence commonly referred to as "alpha" sites. Site 21GDq is an early eighteenth-century gun barrel found by William Sweeney of Red Wing. It was reported to have been "dug up at Barn Bluff... three feet under ground" (Minnesota Historical Society 1871:10).

PREVIOUS CULTURAL SURVEYS

A Phase IA archaeology/Phase I architectural history survey was completed by The 106 Group in 2010 for a riverfront trail in Red Wing (Van Erem et al. 2010). The route of this trail is located along the river on the opposite side of the rail corridor from the kiln. While the G. A. Carlson Lime Kiln was included as a resource within the project's architectural history APE, the trail and its construction was recommended as having no adverse affect on the property.

HISTORIC PHOTOGRAPHS

In addition to primary and secondary records and accounts about the lime industry in Red Wing and G. A. Carlson's operations, one of the principal and most significant sources of

historical information on the layout of Carlson's Barn Bluff lime works is a series of three photographs taken some time after the construction of the 1882 kiln but prior to 1886 (Figures 4-6). Particularly helpful is the convention of posing figures to denote scale, and to help locate obscured features in the landscape such as roads, roof-lines and doorways. Similarities in the details in these images suggest they were taken on the same day. One of the photographs, a stereograph, is identified as having been taken by John P. Wedmark (MHS Neg. No. 519) (see Figure 5). According to other photographs in the MHS collections taken by Wedmark, he was in Red Wing in 1882. It appears that Carlson commissioned the photographs upon completion of the new Barn Bluff kiln as the Wedmark image was converted to a lithograph and printed on Carlson's receipt book which was in use in 1886 (G. A. Carlson File, MnSHPO) (Figure 7). Additional photographs taken in 1900, before 1973, and in 1975 provide further information on the kiln and changes in it over time (Figures 8-10).

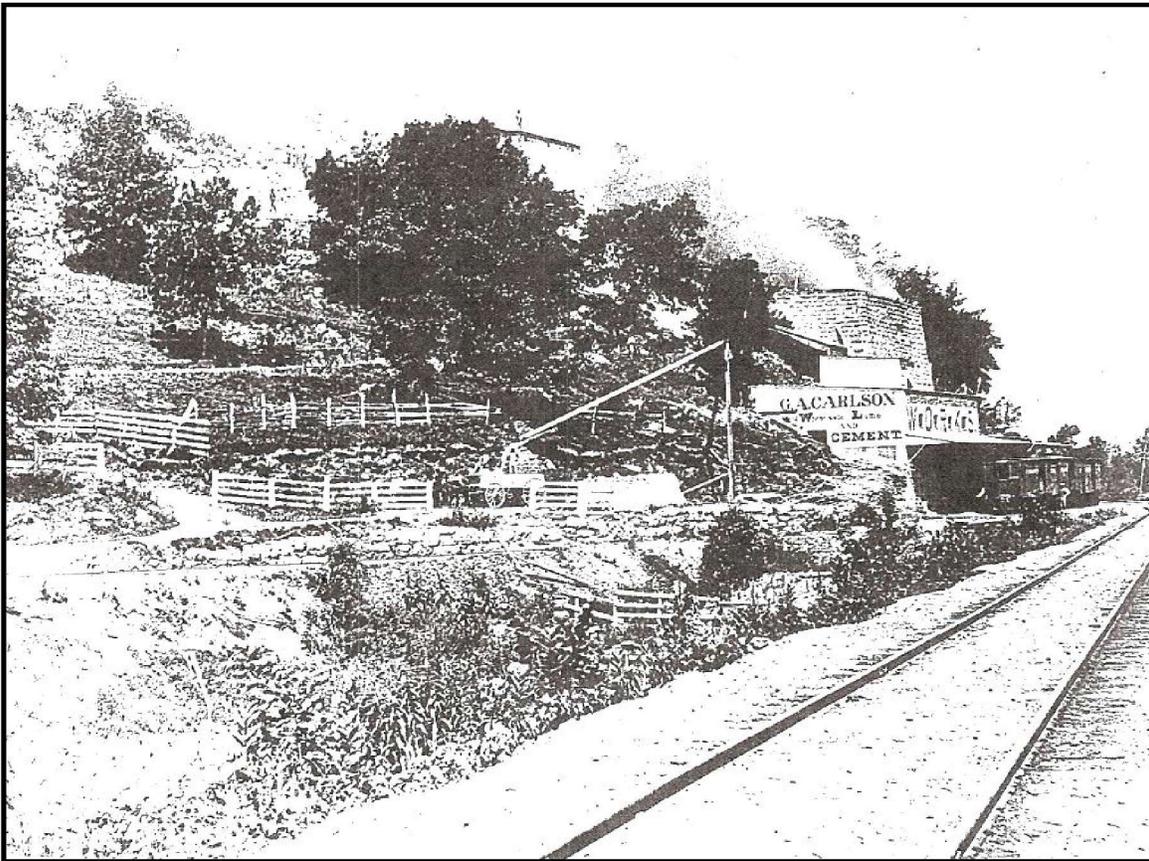


FIGURE 4. CARLSON'S BARN BLUFF LIME WORKS, VIEW TO WEST (GOODHUE CO. HIST. SOC. 1.2.4186)

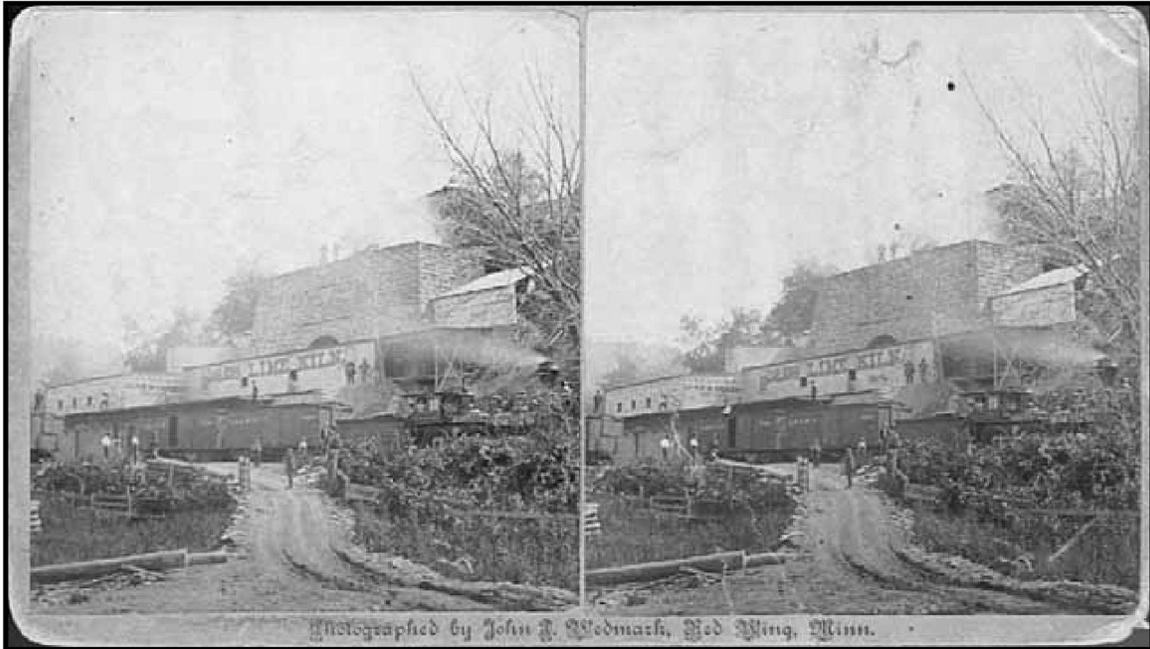


FIGURE 5. STEREOGRAPH OF CARLSON'S LIME KILN AT RED WING BY JOHN P. WEDMARK, VIEW TO SOUTH (MHS NEG. NO. 519)



FIGURE 6. VIEW OF CARLSON'S 1882 LIME KILN, VIEW TO SOUTH (GOODHUE CO. HIST. SOC. 1.2.4187)

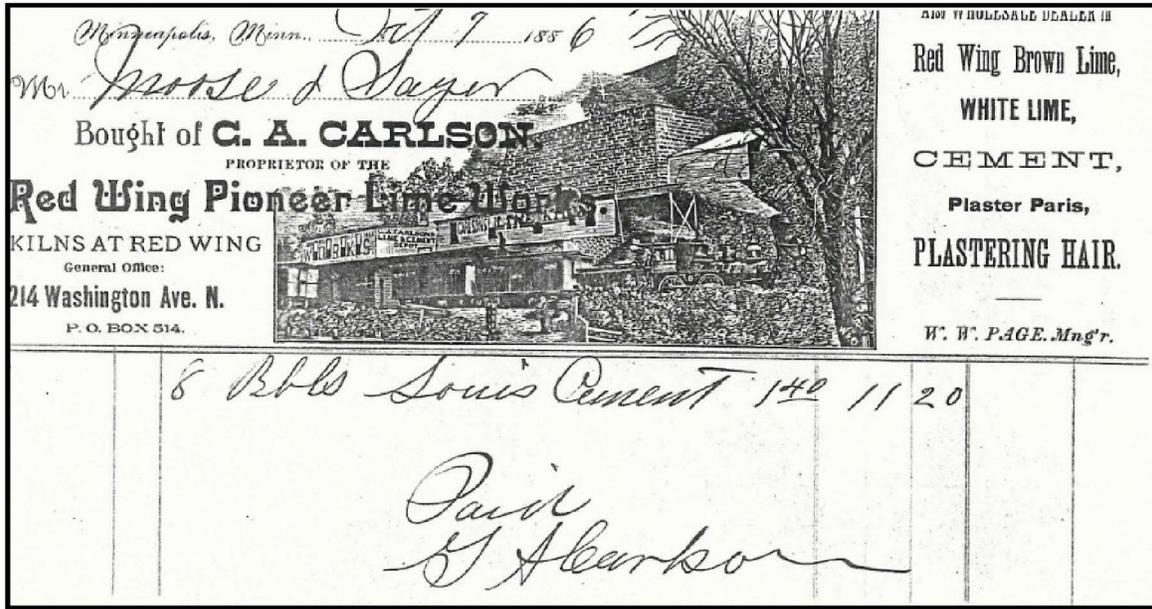
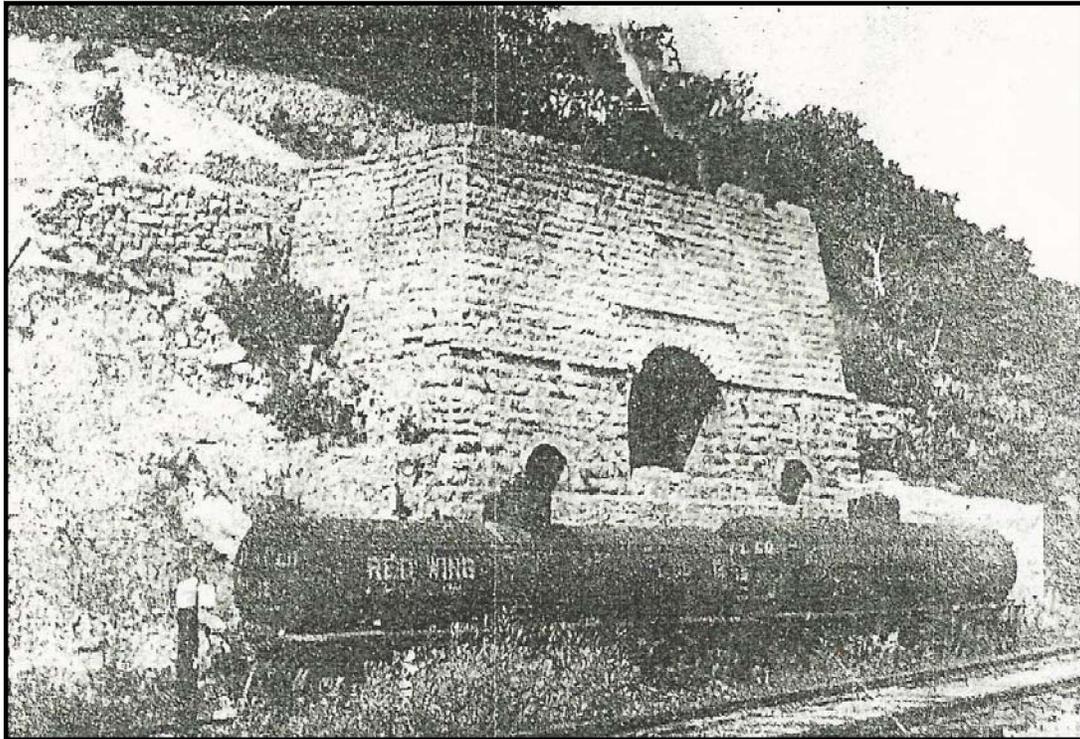


FIGURE 7. RECEIPT FEATURING LITHOGRAPH MADE FROM THE WEDMARK PHOTOGRAPH OF CARLSON'S BARN BLUFF LIME WORKS



FIGURE 8. LOWER END OF BARN BLUFF WITH THE KILN COMPLEX AT THE LOWER LEFT, 1900 (MHS NEG. NO. 2903-B)



**FIGURE 9. THE 1882 CARLSON LIME KILN, VIEW TO THE SOUTH-SOUTHWEST
(*REPUBLICAN EAGLE*, 12- 29-1973)**



FIGURE 10. THE 1882 CARLSON LIME KILN, VIEW TO SOUTHWEST, MAY 1975 (MHS NEG. NO. 01221-33)

ENVIRONMENTAL HISTORY OVERVIEW

Barn Bluff and the Carlson Kiln are located in the Southeast Riverine East archaeological sub-region. The following environmental history of this sub-region is based largely on information contained in Borchert and Gustafson's (1980) *Atlas of Minnesota Resources and Settlement* and an overview entitled "Minnesota's Environment and Native American Culture History" by Gibbon et al. (2002).

The Southeast Riverine region covers most of southeastern Minnesota and continues into the adjacent corners of Wisconsin and Iowa. This region was not glaciated during the Late Wisconsin Ice Age and is characterized by a stream-dissected terrain. The Southeast Riverine East sub-region parallels the Mississippi River south from its junction with the St. Croix River and includes portions of Dakota, Goodhue, Wabasha, Winona, and Houston counties.

The soils in the eastern part of the region are fine-textured forest and prairie soils formed on loess deposits over Paleozoic bedrock. The climate within this region has an average annual precipitation range of 28 and 30 inches. January highs average 23 degrees Fahrenheit (F), while July highs average 85 degrees F. The frost-free season averages 160 days.

During the Late Holocene, forests of elm, ash, and cottonwood lined the river lowlands, while "Big Woods" forests of maple, elm, and basswood occupied the uplands near the Mississippi River. Within the current project area, mixed grassland and hardwood forest was present at the time of initial EuroAmerican contact.

Late Holocene subsistence resources in this region consisted of deer, elk, and occasional bison in the uplands. Mussels, fish, waterfowl, and edible aquatic plants were available in the bottomlands, particularly along the Mississippi River, while prairie turnips and acorns were present on the uplands and savannas of the region.

HISTORICAL CONTEXTS

The Minnesota SHPO has developed a series of broad statewide historic contexts and themes for the interpretation and evaluation of cultural properties (Dobbs 1990a; Dobbs 1990b; MnSHPO 1993). These contexts, which are temporal, regional, and thematic, cover three broad periods of Minnesota's history: precontact (12,000 years B.P. to A.D. 1700); contact (A.D. 1650-1837); and historical-period (1830s to the present). Relevant to the G. A. Carlson Lime Kiln are the historical contexts "Early Agriculture and River Settlement, 1840-1870" and "Railroads and Agricultural Development, 1870-1940."

EARLY AGRICULTURE AND RIVER SETTLEMENT, 1840-1870

Early EuroAmerican settlement in Minnesota and Wisconsin was concentrated along the rivers, which were not only a means of transportation, but also provided a source of power for mills. Townsites were formed along the rivers by speculators, townsite companies, and various groups, the latter often with a common ethnic or social heritage. Many of these towns became centers for the processing of agricultural products from the surrounding countryside, as well as offering a market for those products and a shipping point to other markets via the river.

The land that encompasses Red Wing was not available for EuroAmerican settlement until the 1851 treaties with the Dakota went into effect, however, a small, permanent EuroAmerican presence was introduced at Red Wing prior to the treaty signings, as missionaries, government farmers, and traders established homes proximate to the Dakota village located at the foot of Barn Bluff. Then, in 1852, the EuroAmerican community at Red Wing experienced a sudden influx of land speculators anticipating the treaties' ratification. Claims were made by recently arrived individuals as well those already present within the settlement. The river eased access to the new area, allowing for the reliable transport of goods and building materials from established communities. Andrus Durand, for example, had lumber brought down river from Stillwater to build Red Wing's first hotel in the spring of 1853, giving new arrivals a place to reside while their homes were constructed (Curtiss-Wedge 1909:532-533).

Commercial farming was soon underway within Red Wing proper and the surrounding region (Curtiss-Wedge 1909: 534, 536). The wheat grown in 1854 "was found to be of a most superior quality, and the marketing and shipping of this cereal gave Red Wing its first start as a business point" (Curtiss-Wedge 1909:537). According to Hancock (1893:187), by the late 1860s, Red Wing "was claimed to be the greatest primary wheat market in the world," a claim supported in 1874 by "disinterested authorities like the *Winona Daily Republican*, *St. Paul Press*, *St. Paul Pioneer* and various other journals" (*Red Wing Argus*, February 12, 1874, quoted in Angell 1977:146). Whether or not this claim was valid on an international scale, as a river port in the years before the railroad, Red Wing was certainly positioned to be a primary wheat market, as the town provided convenient access to both sellers and buyers who could then readily ship the wheat once purchased. Beyond agriculture, Red Wing's natural resources and position on the river made it ideal for a number of other small-scale industries that readily took hold while the

city grew in the mid 1850s and 1860s, including brick manufacturing, sawmilling, and flour milling early on, then pottery manufacture beginning in the mid 1860s (Curtiss-Wedge 1909:540-541; Red Wing Pottery 2012).

As the City of Red Wing was taking form (Figure 11), Goodhue County was created from a portion of what had been part of Wabasha County, and Red Wing was made the county seat in 1853. Two years later, Red Wing also became the site of a federal land office, which began selling public lands to current and future residents of southern Minnesota in August of that year. In 1856, a wave of immigration stemming from states to the east and Europe reached Red Wing, setting off increases in the city's commercial, service, and institutional sectors as residents strove to fill the physical, practical, and cultural needs of themselves and others. While these increases were slowed by the Panic of 1857, Red Wing would rebound with the rest of the country (Curtiss-Wedge 1909:539-542). In the late summer of 1870, another wave of immigration brought over 1,000 new residents to the city, raising its population to over 5,200 (Walker 1872:178; Angell 1977:149). This population by and large was comprised of Norwegian and Swedish immigrants, though strong German, British, and Canadian elements were also present (Angell 1977:150). With a sizeable population in place, and buildings containing everything from banks to billiard halls, churches to a courthouse, grocery stores to jewelry stores, and telegraph offices to newspaper offices (Curtiss-Wedge 1909:544-546), the urbanization of Red Wing was nearly complete by the end of the 1860s. In that era, however, what it needed to be truly viable, and freed from the limitations of an annually frozen river, was a railroad.



FIGURE 11. DETAIL OF RED WING FROM THE 1856 GENERAL LAND OFFICE SURVEY MAP

RAILROADS AND AGRICULTURAL DEVELOPMENT, 1870-1940

The City of Red Wing's earliest attempt at obtaining a railroad occurred during the 1863-64 fiscal year, when the city council "adopted a plan for surveying a railroad from Winona to St. Paul, the city offering to pay seven per cent interest to anyone who would advance money for the project" (Curtiss-Wedge 1909:552). However, there were no takers and the \$700 raised was returned the following fiscal year (Curtiss-Wedge 1909:553). Within a few years, however, the St. Paul and Chicago Railroad Company had been incorporated to build a Mississippi River route from St. Paul to Winona, with construction beginning in St. Paul in 1869. This railroad connected Red Wing with Hastings in September of 1870, and was subsequently extended beyond Winona to La Crescent in 1872, just after the St. Paul and Chicago was purchased by the Milwaukee and St. Paul Railway Company. The Milwaukee and St. Paul became the Chicago, Milwaukee, and St. Paul (CM&StP) in 1874 (Prosser 1966:140, 158; Angell 1977:144).

While the spread of the railroad network across Minnesota and beyond resulted in the waning of Red Wing's status as a primary wheat market, it yet remained an important grain shipment center. At the same time, the introduction of the railroad to the city spurred its economic diversification by facilitating the expansion of milling and other industries, such as quarrying, by creating connections to new and distant markets. With the railroad running along the steamboat levee, industrial concerns marketing heavy shipments could locate there to take advantage of both methods of transportation. Between 1873 and 1877, several mills (Bluff, Diamond, Red Wing, and La Grange) were constructed along the city's rail line (Hancock 1893:216-218; Angell 1977:153-154). By 1880, large grain warehouses belonging to concerns such as T. B. Sheldon and Company and Hubbard and Brown lined the railroad between the Red Wing and La Grange mills (Shober and Carqueville 1880). Other 1870s enterprises not located directly on the railroad were established nearby in the city's quickly growing downtown. These businesses included numerous retail stores that received their wares via the railroad, factories that obtained raw materials and shipped finished goods via rail, and hotels that enjoyed a substantial new clientele of rail passengers. Of note is the St. James Hotel, financed through a joint stock company by citizens of Red Wing and completed in 1875, after being deemed necessary to reflect the city's status as "one of the leading business centers of Minnesota and the Northwest" (Angell 1977:154). The subject of this report, G. A. Carlson, supplied the foundation stone for this impressive structure (Wood, Alley, & Co. 1878:403).

The riverside line was part of the CM&StP main line from Chicago, and by the early 1880s, it had extended beyond Minneapolis to South Dakota (Prosser 1966:12), linking Red Wing not only to the urban centers of the Twin Cities and Chicago, but also to inland agricultural markets and wheat sources to the west. In 1884, the CM&StP completed a branch line from Red Wing (Cannon Junction) to Northfield. Likewise, the Minnesota Central Railroad Company built a line from Red Wing to Waterville in 1882, and the Duluth Red Wing and Southern Railroad Company (both later purchased by the Chicago Great Western) completed a line from Red Wing Junction to Zumbrota in 1889 (Prosser 1966:131, 221).

Coinciding with the expansion of Red Wing's railroad network was an expansion in its manufacturing interests, which continued into the turn of the twentieth century, and only briefly slowed for a period following the Panic of 1893. The years between 1870 and 1900 witnessed the increasing economic prominence of Red Wing's industrial sector. This era gave rise to the Red Wing Manufacturing Company formed in 1882; the growth of a 40 year lime and stone industry; the 1885 expansion of the La Grange Mills, and the establishment of the advertising paraphernalia manufacturer that would become Red Wing Advertising Company (Hancock 1893:218, 220; Curtiss-Wedge 1909:633, 968; Angell 1977:172, 174-176, 202).

The period between 1880 and 1900 additionally saw the city's first creamery, built in 1885 and not a moment too soon, as a series of chinch bug invasions beginning in that year forced a transition by the area's farmers from a concentration on wheat to diversified farming. By the mid to late 1880s, dairy farming was a solid component of this diversification. Cultivation of crops like oats, potatoes, and flax, and employment of new crop rotation methods between grains and plants such as clover and timothy, opened up growth livestock production (Rasmussen 1933:129-130, 136, 149-150; Angell 1977:233). As Red Wing transitioned into the twentieth century, barley became a major focus of farming in the area, overtaking wheat for several years as the major crop in Goodhue County (Angell 1977:248). The raising of other crops in addition to wheat was such a success that three new grain processing plants joined La Grange Mills along the railroad in 1901, these belonging to the Red Wing Linseed Mills, the Red Wing (later Fleischmann) Malting Company, and the Simmons (later Red Wing) Milling Company (Curtiss-Wedge 1909:635; Rasmussen 1933:156). The addition of these plants likely played into the decision by the CM&StP to build a separate passenger depot and replace the former combination depot with a freight house in 1904. Despite the success of diversified farming, its practice in the vicinity of Red Wing was largely abandoned during World War I due to the higher prices realized by wheat. The shift back to wheat without appropriate rotation, however, had a deleterious effect on the soil quality in Goodhue County, and wheat farming ended shortly after the war (Angell 1977:273). Also, at this time, steamboats were phasing out, leaving the railroads to do the bulk of grain transportation and other types of shipments in and out of Red Wing.

During the time that diversified farming was on the rise before the turn of the century and into the war era, Red Wing's commercial sector underwent some fluctuation, for example the once leading lime and stone industries ended, but after a decade or so settled into a general pattern of stability. As the 1920s drew to a close, Red Wing, like the rest of the country, was staring into the Great Depression, although it did not have as strong an effect until the local population began to run out of its conserved finances in 1931 (Rasmussen 1933:203-204). Even then, Red Wing's industrial sector struggled but remained viable. Although work forces were reduced, none of the city's major industries were forced to shut down (Angell 1977:306, 309-310). The economy of Red Wing received a major boost during World War II, thanks to the continuation of the grain processing plants, and other Red Wing industries being called upon for increased wartime production, such as Meyer Machine and the S. B. Foot Tanning Company. As the

economy recovered during the 1940s, 26 new commercial or service enterprises made Red Wing their home (Angell 1977:340, 344).

Against this ambitious background rose the lime and quarrying industry of Red Wing.

HISTORICAL NARRATIVE

One of the principal enterprises of Red Wing that benefitted from city's combination of readily available raw material and river and rail transportation was the lime industry.

The Lime Burning Process

The conversion of limestone to quicklime requires that the stone be heated to at least 900° C / 1650° F. At that temperature the carbon dioxide in the rock is driven off, leaving calcium oxide, otherwise known as quicklime or burnt lime. Quicklime is a caustic alkaline that reacts violently with water. However, when slaked, or mixed with water into a slurry, and allowed to set, it solidifies. This process, the basis of mortar, plaster, concrete, and whitewash, has made quicklime a desirable building product for thousands of years.

Early kilns were simple affairs consisting of pits in the ground, or "clamps," into which the limestone and fuel was piled then covered with earth or clay and allowed to burn down (Williams 1989). Through time, the process became increasingly industrial and permanent kiln structures were devised. These upright, squat to tower-like structures are built of stone and have rounded central chambers in which the limestone is heated and converted to quicklime (Figure 12). The interior of the burning chamber, which typically tapers near the base, is lined, often with firebrick, in order to keep the heat of the kiln from breaking down the very stone of which it is often constructed. An arch at the base of the kiln allows for the removal of the finished product. Kiln structures are typically built into hillsides to facilitate the loading of the kiln chamber from above. While being fired, the top of the chamber is left open in order to allow for caustic fumes and gases to exhaust.

One form of kiln, often called a "pot kiln," is an "intermittent" or "periodic" type filled with a single charge of limestone and, once fired, must be allowed to cool so that the quicklime can be removed (Lazell 1915:24-25). Improving on this process, a "perpetual" or "draw" kiln, is kept burning continuously by filling the kiln from the top with alternating layers of fuel and stone (Lazell 1915:26). As the kiln burns, the quicklime is drawn off at the base of the kiln. An even more efficient design for the perpetual kiln used side arches near the base of the kiln to heat the stone, while only limestone was added from above (see Figure 12). This method of using separate fire boxes produced a more uniform calcination and the resulting lime was cleaner for not having come into contact with the fuel (Heath 1893:31; Lazell 1915:30). While fuels may vary, the use of irregularly shaped limestone cobbles is imperative as it allows for air circulation around the charge, thereby facilitating the burning process, and keeping the mass from clogging in the kiln.

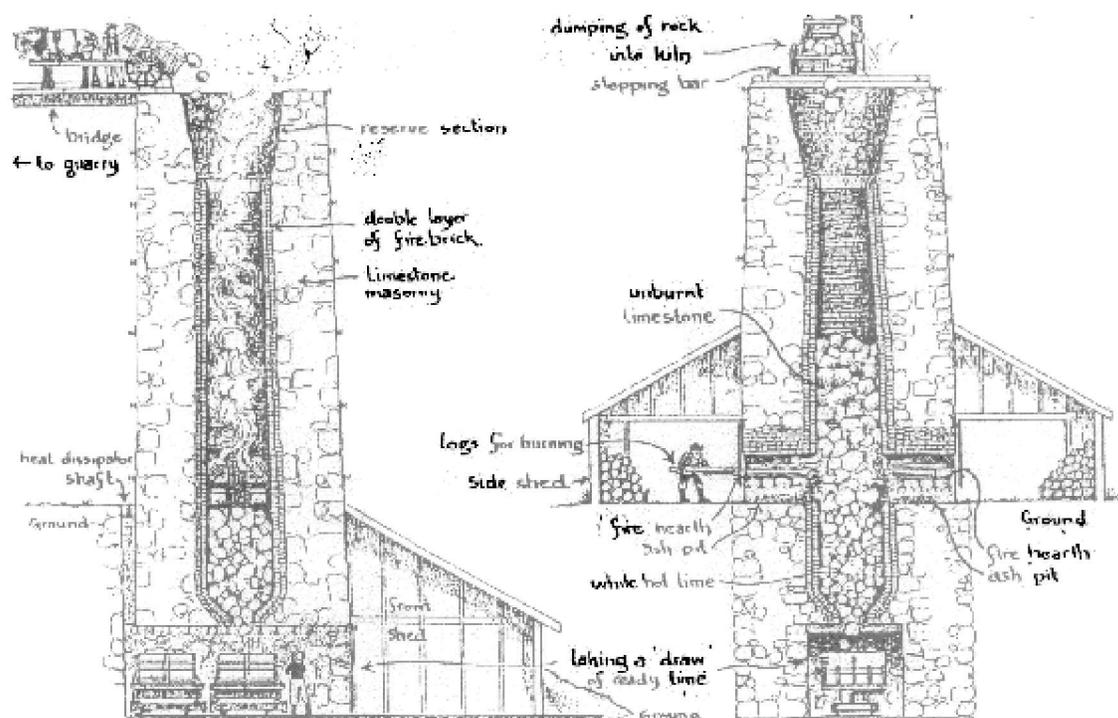


FIGURE 12. ILLUSTRATION OF A LATTER HALF OF THE 19TH CENTURY LIME KILN
(WABASH AND ERIE CANAL PARK [INDIANA] 2009)

In order to keep fuel, and the reactive quicklime dry, kilns are typically surrounded by attached sheds in which the finished quicklime is placed in barrels for shipping. Because quicklime can absorb moisture from the air, hardening and rendering it useless, packing the lime in barrels must be done promptly lest the product be ruined before it is even off the production floor.

The Red Wing Lime Industry

As a great deal has been written on the geology and general history of lime and stone works in the Red Wing area, this narrative will provide only a brief overview. Although a major industry in the city for nearly 40 years, the beginnings of the quarry and lime industries in Red Wing are not extensively documented in primary records. Permits were not recorded in Red Wing prior to 1929 (personal communication, personnel at the City of Red Wing Public Works and Planning Department), and personal and real property tax rolls do not provide specific information regarding holdings. Furthermore, historic maps of the Sorin's or Barn Bluff portions of Red Wing (the two primary locations of stone and lime working in the city) are limited in their detail, and the Sanborn Map Company does not include it in their coverage.

Anecdotal reports of the first lime being burned in the area date to around 1853 and were undertaken by mason Phineas Fish, who collected pieces of lime fallen from the bluffs (Eide n.d.:35). The first lime kilns in Red Wing were constructed and run by Norwegian immigrant Halvor Peterson and a trader, Mr. Snow, who, on a trip up the Mississippi

River towards St. Paul, stopped near the site of Red Wing and began producing lime (Eide n.d.:36). These first lime kilns were most likely “pot kilns,” a primitive type of periodic kiln in which the fire must be allowed to go out in order to empty the lime and refill with more stone and fuel for the process to begin again (Eide n.d.:18).

As the area began to thrive in the 1860s, small quarries and kilns began appearing on many bluffs in the region, but it was not until the 1870s that the lime industry advanced in Red Wing. This escalation was in part due to the introduction of the patent-kiln, also known as a perpetual kiln, which allowed limestone to be loaded into and the lime extracted from the kiln continuously without stopping the firing process (Lazell 1915:26). At its peak, from c.1870-c.1908, there were as many as 16 quarrying companies in operation at any one time in the Red Wing area, with the majority of the larger quarries and kilns located on Barn and Sorin’s bluffs on the eastern edge of Red Wing (Johnson 2000:102). It was during this time that many of the important names in the lime industry were in operation, including, F.S. Linne, the Twin Cities Lime and Cement Company, and G. A. Carlson.

The Linne Kilns, established in 1879, were located on the south side of Barn Bluff overlooking East Red Wing. These kilns stayed in operation until 1890, when they were abandoned for the more lucrative kilns and quarries on the north side of the bluff (Eide n.d.: 38). Kilns on the north side of the bluff were initially constructed in 1888 by the Twin Cities Lime and Cement Company, before being purchased by Linne in 1890. These kilns were located beneath a quarry on the north side Barn Bluff and were supplied from this quarry via a trestle and cable car system that brought quarried stone down to the kilns, which were located at the base of the bluff near the railroad tracks. An early innovator, G. A. Carlson also operated two kilns and a quarry on the east end of the Barn Bluff. These kilns are discussed in further detail below. By 1908, all stone quarrying and lime kiln operation ceased on Barn Bluff accelerating the decline and collapse of the lime industry in Red Wing (*The Red Wing Daily Republican* 1908; Johnson 2000:104).

G. A. Carlson’s Red Wing Pioneer Lime Works on Barn Bluff

Gustavus Adolphus Carlson owned and operated the Red Wing Pioneer Lime Works complex consisting of a quarry and two lime kilns on the east end Barn Bluff, and two more kilns and quarries on Sorin’s Bluff. The Barn Bluff portion of his company was located on Government Lots 3 and 4 of Township 113 North, Range 14 West. No direct sources of information regarding the construction or operation of the works on Barn Bluff (e.g., company records) could be located in the course of this study. The following information has been gleaned from historic maps, tax records, contemporary newspaper articles, reminiscences, county histories, and secondary sources. One note is made here that some confusion is created in the documentary record by past writers alternately referring to a burn chamber as a “kiln” and to kiln structures, often incorporating multiple burn chambers, as a “kiln.” For example, Carlson’s six-chambered complex on Sorin’s Bluff may be enumerated by one writer as six kilns, and by another author as a single kiln. Because of this, accounts often conflict in their tally of kilns operating at any one

given time. Hence this report focused on recording the location of kiln sites within Red Wing, rather than the number of kilns associated with individual operations.

Carlson's first kiln was on located on East 7th Street at the foot of Sorin's Bluff. Having arrived in Red Wing in 1856, Carlson began producing lime in a periodic kiln at this location as early as 1863 (*Minneapolis Tribune* 1874; Lieberman 1973:1). In 1871, he opened the Red Wing Pioneer Lime Works combining his East 7th Street operations with the development of a novel perpetual "tunnel" kiln on the northeast corner of Barn Bluff. An innovative design, the tunnel kiln, constructed in 1872, was the first of Carlson's kilns on Barn Bluff. Annual building statistics for 1872, published in the *Red Wing Argus* and *Red Wing Republican* on February 18, 1873, record the investment of G. A. Carlson of \$6,000 in a kiln and \$4,000.00 in a quarry. The resulting tunnel kiln appears on the 1874 Campbell map of Red Wing. By 1875, the Chicago, Milwaukee, and St. Paul had constructed a rail spur at the base of Barn Bluff to service the new kiln. The railroad also constructed spurs outside Carlson's office and warehouse in St. Paul, providing direct shipment of his products from kiln to sales-floor in this major Midwest market (*The Grange Advance*, 15 June 1875:1).

Very similar to Andrew Danielson's slightly later tunnel kiln (1873/4) on Sorin's Bluff (with which it is sometimes conflated) (*Red Wing Argus*, 16 April 1874), Carlson's tunnel kiln on Barn Bluff connected directly to the quarry floor. The operation consisted of a 90 foot vertical shaft, giving way to a fire box which connected to a 150 foot horizontal tunnel (*The Grange Advance* 1874). The interior of the tunnel contained rails that facilitated the transport of the finished lime to the lime house. This kiln's entire process thus made efficient use of gravity as limestone rubble was deposited directly into the kiln shaft from the floor of the quarry and then the finished lime was loaded into tram cars and rolled down the tunnel. In order to protect it from moisture, the quicklime was presumably quickly packed into barrels in the lime house constructed near the tunnel entrance (see Figure 33), then carted down the bluff on a series of switch back roads to the rail spur at the foot of the bluff where it was loaded for shipment.

In 1878, Carlson's two perpetual kilns [tunnel kiln and East 7th Street] were producing 18,000 barrels of lime annually (Hancock 1878:198). Yet, Carlson was not able to keep up with demand for his lime. Therefore, in 1882 he built a new improved kiln complex on Barn Bluff directly below his tunnel kiln (*Red Wing Argus* 1882). This lime works consisted of two perpetual kilns enclosed within a single limestone structure built into the base of the bluff and immediately adjacent to the railroad spur. In the construction of this kiln, Carlson adopted the more efficient process of using side fire boxes to heat the burn chambers. The complex also included an attached lime dry house and a "lime and cement depot," while a stone yard accessed by cart roads and equipped with a pole derrick was located a little further to the east. The kiln complexes on Barn and Sorin's bluffs ran concurrently for many years, at one point recording 85,000 barrels being shipped annually out of the facilities (Hancock 1888).

In 1888, the massive amount of fuel demanded by the myriad lime and stone companies and other industries operating in and around Red Wing, had completely consumed the

wood supply for miles around the city. Carlson had taken to having slab (unusable outer cuts of logs generated by saw mills) shipped down from Stillwater, Minnesota to fire his kilns (Lieberman 1973:1). As even that supply began to be unreliable and more costly, Carlson cast around for an alternative. Determined to take advantage of the coal gasification plant in Red Wing, Carlson undertook the design and building of six new “gas fired” kilns on Sorin’s Bluff (Hancock 1888:20; Eide n.d.:41). While a St. Paul article in 1892 states the kilns are operational, but it is clear the project is complicated, inefficient, and fraught with set backs. The same year, *The Red Wing Republican* reports that Carlson is still tweaking his new gas kilns (19 February 1892:3).

At his peak, G. A. Carlson was running 11 lime kilns, two quarries supplying both cut limestone for building and raw stone for quicklime, employed 65 men and had offices in Red Wing, St. Paul, and Minneapolis (Hancock 1888:20; Lieberman 1973:14, Brown n.d.:2). His business shipped out roughly 520 barrels of lime, using 20 cords of wood a day, and make \$75,000 annually (Brown n.d.:2). At various points he was an alderman and city council president, an original investor in the new gas and power plants in Red Wing, and generally a leader of industry. Nevertheless, the experimental kilns on Sorin’s Bluff did not perform as planned, with much of the heat escaping the kiln and resulting in incomplete burns (Lieberman 1973:14). The gas-fired kilns are ultimately unsuccessful and the expense, perhaps exacerbated by the financial panic of 1893, bankrupts the once prosperous Carlson by 1894. As a result of his financial failure, Carlson’s works on Barn Bluff are under the new ownership of H.L. Olson in 1894. Carlson dies penniless in 1903 at the age of 67.

Olson continued to run the lime works and quarries for a few more years, however, by the early twentieth century increasing costs of fuel, coupled with a decrease in the use of lime in favor of other materials, such as concrete blocks and Portland cement, led to a decline of the stone and lime industry (Lieberman 1973:14). By 1908, the stone industry in Red Wing was severely curtailed due to economic factors and community pressure. The ceaseless, tremor-inducing blasting at the quarries, which was disrupting life even across the river in Wisconsin, and the continuing defacing and exploitation of Barn Bluff gave rise to a preservation movement. When a contract was awarded to the CM&StP railroad for 200,000 cubic feet of Barn Bluff limestone for ballast, a real fear grew that the great icon of the city would literally be reduced to rubble (Johnson 2000:103). In response to public pressure, the railroad agreed to halt the project. Pressure to preserve the beloved hill led to the donation in 1910 of the bluff to the city by a philanthropic coalition of James Lawther, the Bank of Pierce, Simmons and Company, the Red Wing Manufacturing Company, and C. A. Beecher (*Willmar Tribune* 1910). With the donation and protection of Barn Bluff assured, the stone industry continued to decline until the last quarry in the region ceased operation in 1920 (Johnson 2013).

The tunnel kiln was eventually used to store dynamite for sewer construction projects along Bluff and East 7th Streets in East Red Wing, as well as for blasting projects along the northern edge of the bluff during the early twentieth century (*The Red Wing Daily Republican* 1908). In 1941, a permit was requested by the Izaak Walton League to demolish the remains of the 1882 kiln and to use the cut limestone from the structure for

another project (Larsen 1991). The project was abandoned and after several more decades of alternating neglect and revived interest, the 1882 kiln was listed on the National Register of Historic Places in 1976. The structure still stands at the base of the bluff, and is the most visible remnant of G. A. Carlson's Red Wing Pioneer Works on Barn Bluff.

FIELDWORK RESULTS

In June and July of 2014, Two Pines completed the fieldwork portion of the archaeological investigation of the Carlson lime works on Barn Bluff. The archaeological investigation of 21GD0297 consisted of the documentation of the features of the lime works through visual inspection, scale drawings, and photographs. The Principal Investigator was Michelle Terrell and she conducted the fieldwork with the assistance of Joe Pnewski and Alexis Thorpe.

WORK SUMMARY

Field investigations commenced with the documentation of the two-chambered Carlson Lime Kiln (GD-RWC-20) at the foot of Barn Bluff. Fieldwork coupled with the results of the intensive literature search demonstrated that the existing Carlson Lime Kiln structure is a remnant element of a much larger industrial complex that was Carlson's Red Wing Pioneer Lime Works on Barn Bluff (Figure 13). These operations included a series of kilns, together with the roadways that connected the kilns to quarries on the upper portion of the bluff, a devoted rail spur and other ancillary features. The results of the fieldwork and descriptions of the elements of the lime works are provided below.

1882 Kiln (GD-RWC-20)

In 1882, Carlson constructed a two-chambered kiln at the foot of Barn Bluff (Figures 14-15). It is this kiln that is customarily referred to as the G. A. Carlson Lime Kiln, although other kilns operated by Carlson are still extant in Red Wing. As this kiln is described in detail in a separate HSR prepared by MacDonald & Mack Architects, this report will principally document the kiln as it relates to, and functioned within, the lime works complex.

In plan, the 1882 kiln is approximately 64 ft. by 26 ft. and oriented 30 degrees west of north. The rear of the kiln is built into the bluff and, particularly on the east side of the building, natural bedrock provides a solid base for the foundations and retaining walls of the kiln complex. Vertically, the kiln is divided into three zones: (1) a foundation of large limestone blocks that projects one foot beyond the east and west edges of the building; (2) the square-edged second level within which the building's fire boxes and draw arches are located; and (3) the chimney portion of the building with its chamfered corners that rise above the roofline of the once-attached lime house.

The north face of the kiln features a 16-ft. wide central arch (Figure 16). This arch is approximately 13 ft. 4 in. tall from the foundation of the kiln (only a portion of which remains at the front of the arch) to the apex of the arch. The central arch is approximately 17 ft. deep and features two 7 ft.-10 in. fire box openings connecting to the kiln chambers. Within the rear wall of the central opening is a 5.5-ft. high, 2 ft.-10 in. wide, and 3-ft. deep ventilation shaft that would have allowed for the dissipation of heat and fumes. The upper portion of the kiln's central arch was also open above the roof of the lime house allowing for additional ventilation. The lower portion of the rear wall of the central arch has failed.

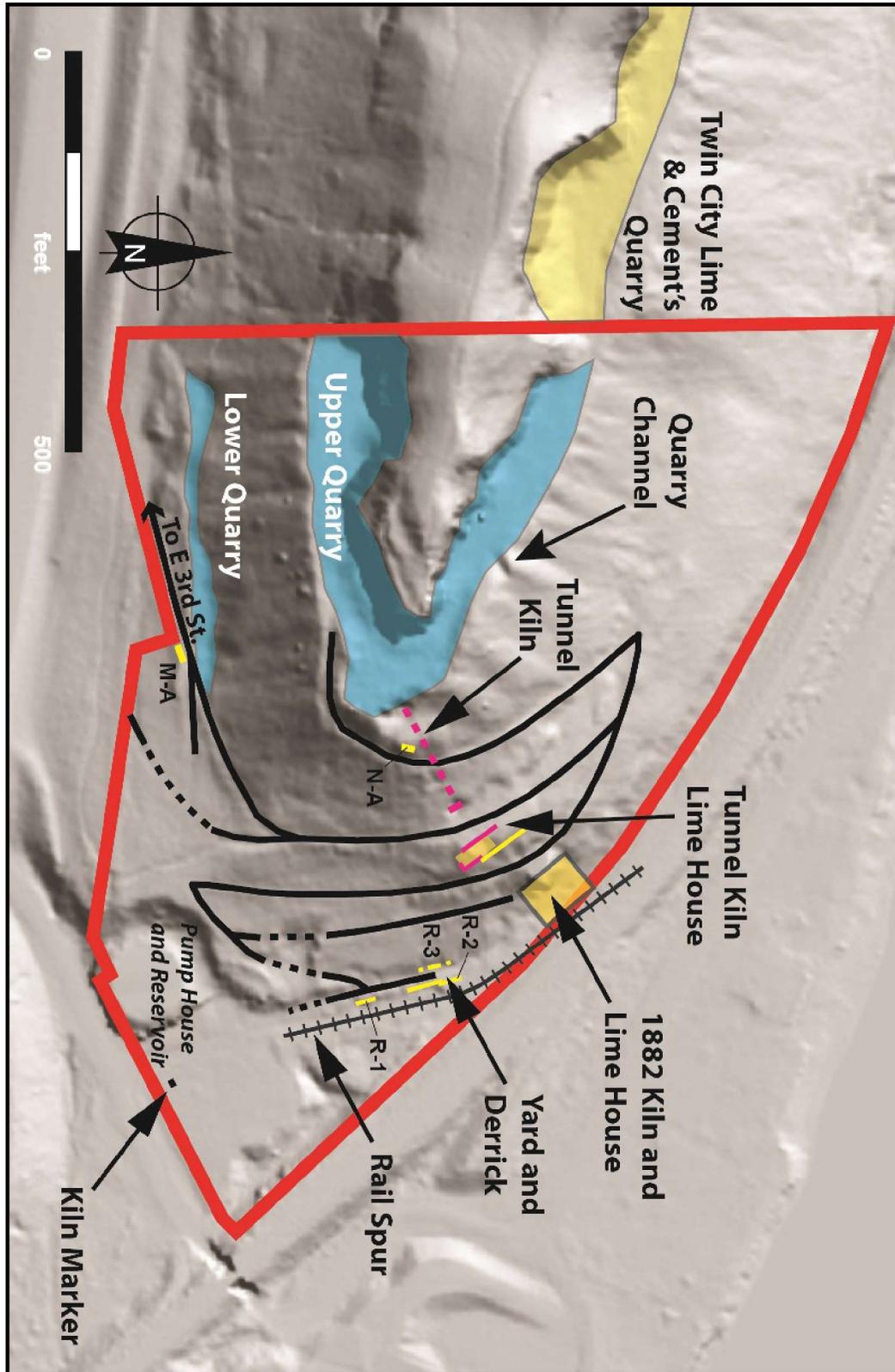


FIGURE 13. G. A. CARLSON'S RED WING PIONEER LIME WORKS ON BARN BLUFF

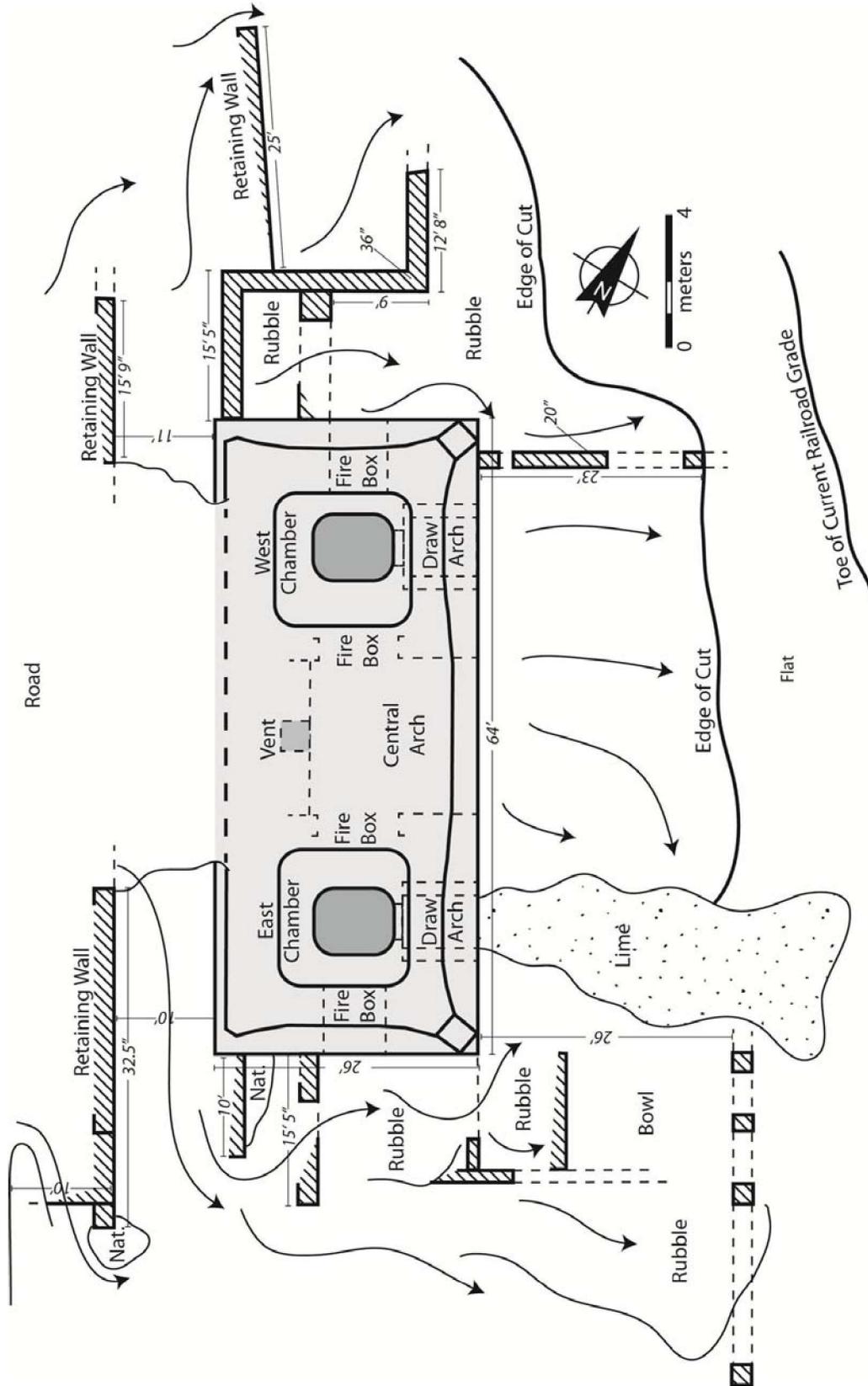


FIGURE 14. PLAN OF 1882 KILN AND SURROUNDING FOUNDATIONS AND RETAINING WALLS

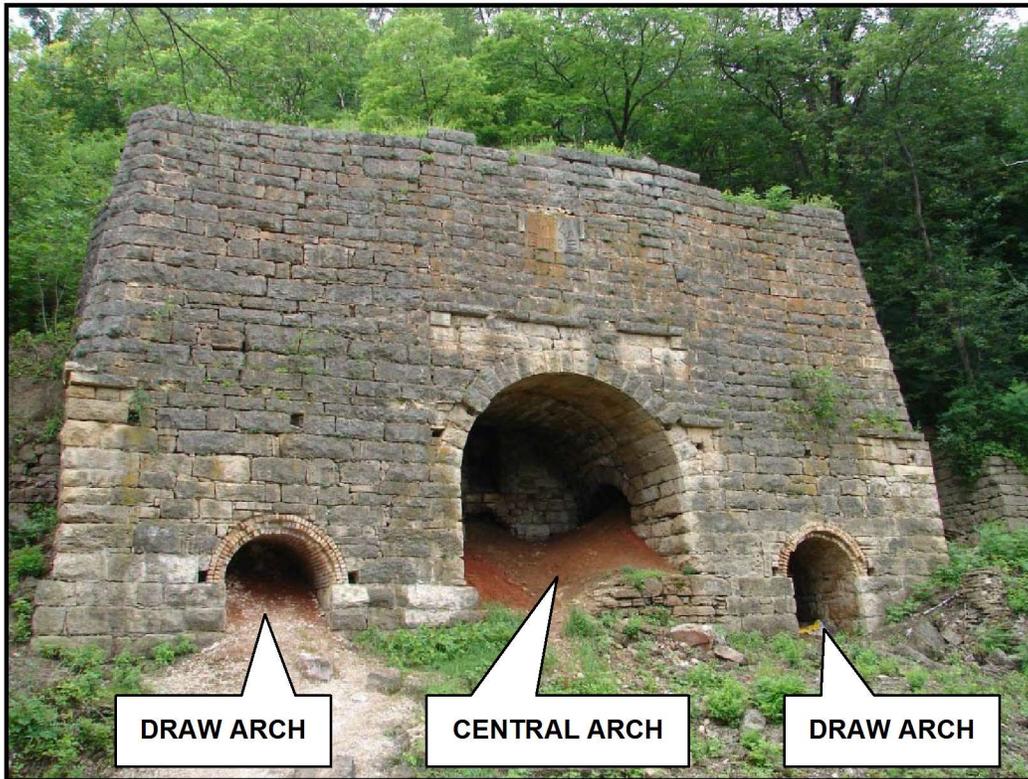


FIGURE 15. THE DOUBLE-CHAMBERED 1882 CARLSON LIME KILN, VIEW TO WEST-SOUTHWEST

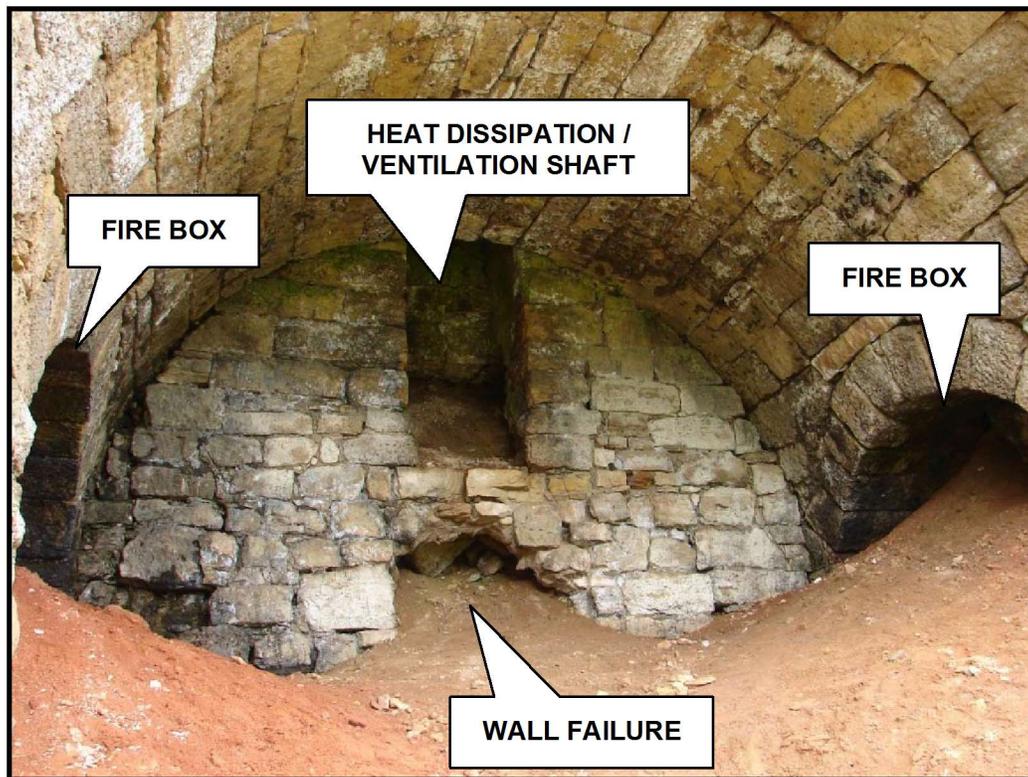


FIGURE 16. THE INTERIOR OF THE 1882 KILN'S CENTRAL ARCH

On either side of the central arch at a distance of 10 ft. are two draw arches (see Figure 14). The west arch is slightly larger being 6 ft. wide and 8 ft. deep, while the east arch is 5.5 ft. wide and 7 ft.-7 in. deep. Above the foundation course, the roof of both draw arches is formed of three courses of fire brick. The rear wall of the west draw arch, which is constructed of firebrick, is still intact and contains two openings (Figure 17). The upper opening is the “poking hole,” through which the load could be agitated and broken up with a rod (or poker), while the opening below is the draw hole through which the quicklime was removed (Williams 1989:17-18). A metal grate is usually present between the two. The rear wall of the east draw arch has failed, and the quicklime that was once contained within the kiln has eroded down the slope in front of the kiln (see Figure 14 and 18). The draw arches were enclosed within the lime house in order to keep the kiln’s product dry (Figure 19).

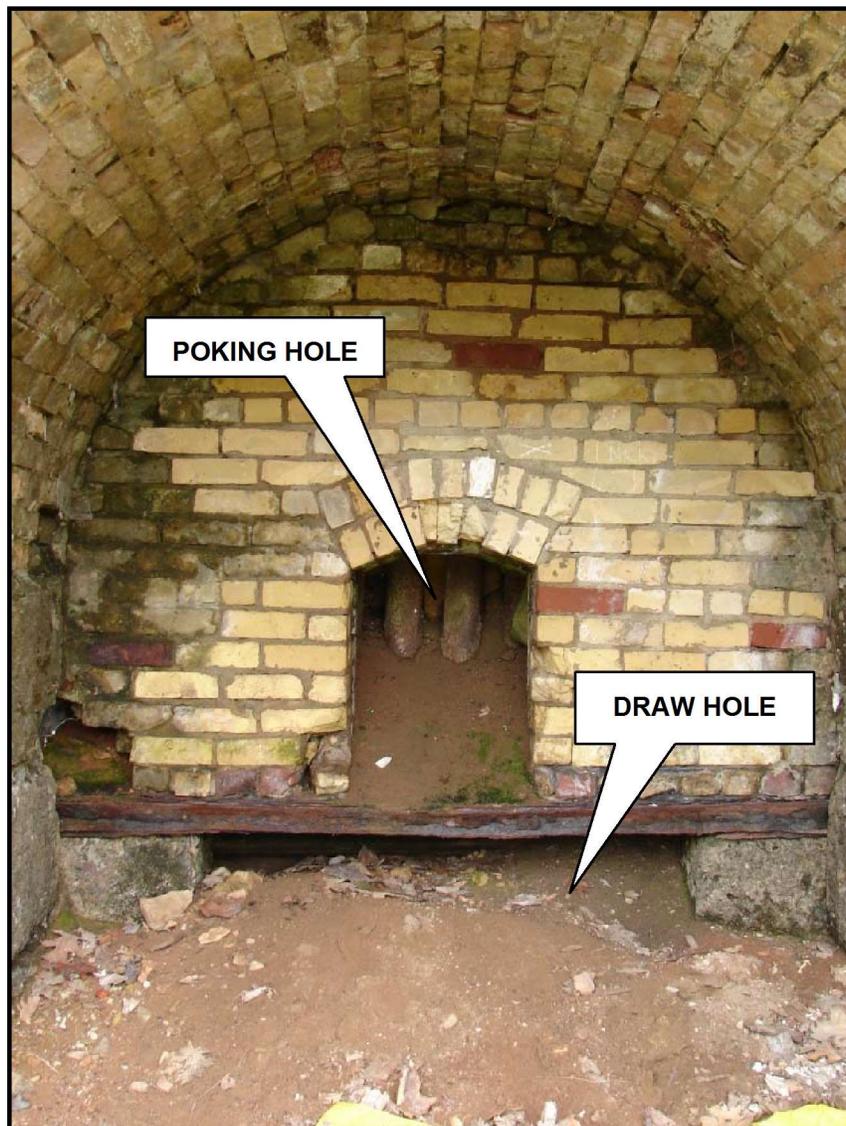


FIGURE 17. THE INTACT DRAWING EYE WITHIN THE WEST DRAW ARCH OF THE 1882 KILN



FIGURE 18. THE DRAWING EYE OR REAR WALL OF THE EAST DRAW ARCH HAS FAILED

On the exterior of the east and west walls of the kiln, at an average distance of 9.5 ft. from the corner of the kiln structure, are two additional fire boxes (see Figure 14). Both of these openings are partially covered by slopewash, but the visible portion of both arches is approximately 6 ft. across. A brick lining is visible within the east arch. These arches are located on the opposite side of the kiln chamber from the fire boxes within the central arch allowing for the even heating of the limestone charge within the kiln. These side arches were each covered by sheds (Figures 19 and 20). On one of the historic images, stacked wood is visible near the west exterior fire box.

Atop the kiln, which is smaller in plan than the kiln's base due to the chamfered corners and tapering profile of the upper portion of the kiln, are the two firing chambers (see Figure 14). The brick-lined chambers each measure about 6.5 x 8 ft. Due to the failure of the drawing eye in the east chamber, the interior of the chamber is nearly empty (Figure 21), while the west chamber is full of rubble (Figure 22). The top of each chamber has a limestone block collar that is wider towards the center of the kiln and towards the bluff, which would have facilitated loading from those directions. Historic images suggest the top of the kiln chambers was formerly fitted with an additional iron collar, or stopping block (Figure 23).

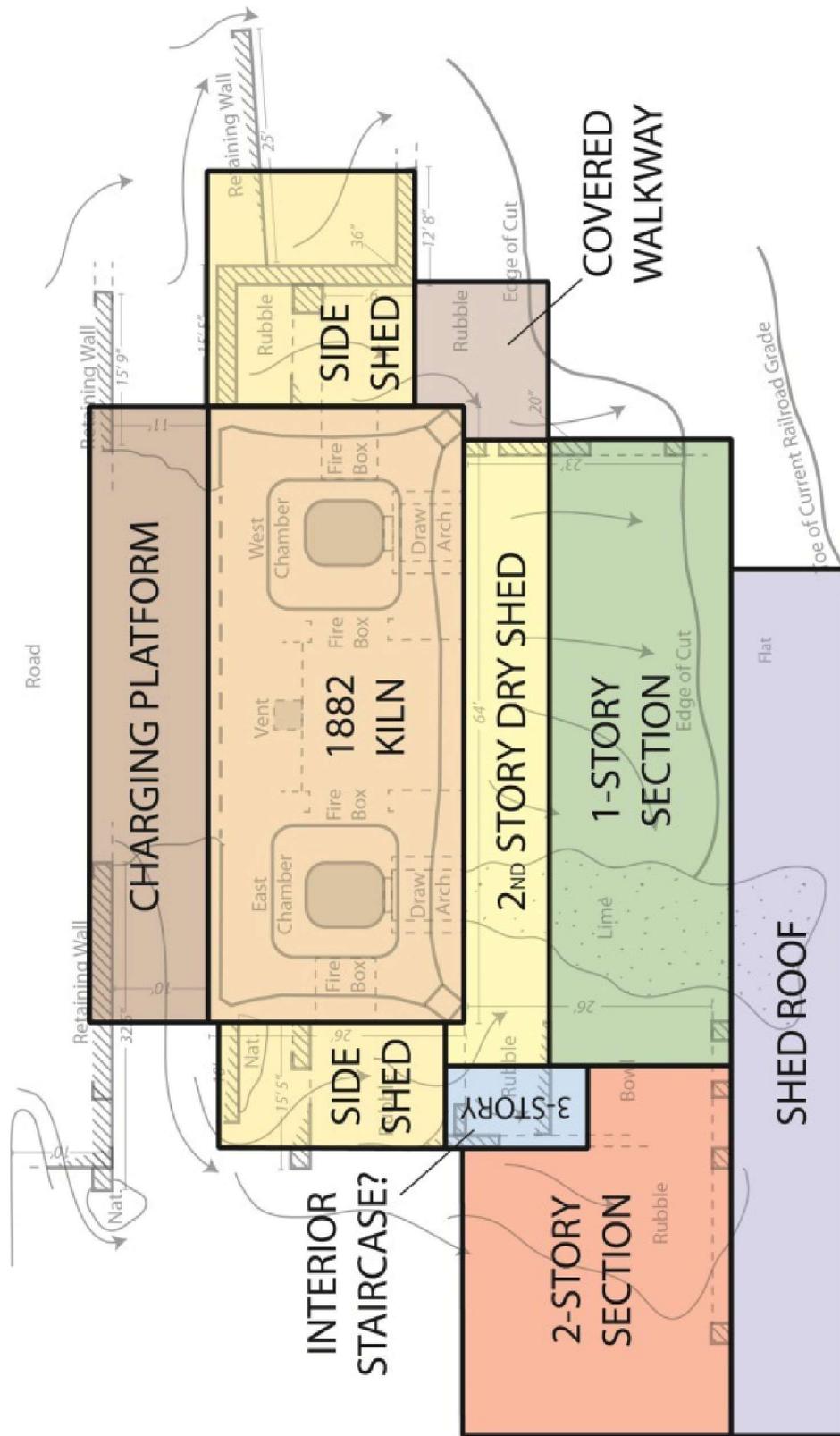
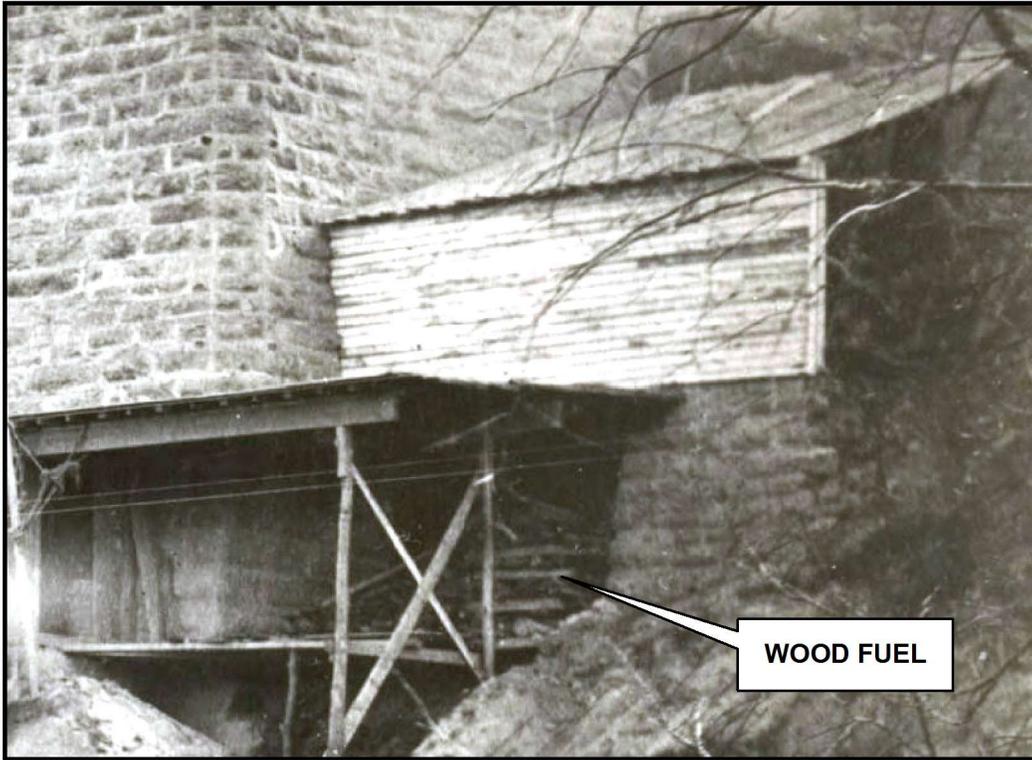


FIGURE 19. PARTS OF THE 1882 KILN AND THE SURROUNDING LIME HOUSE



**FIGURE 20. FEATURES OF THE 1882 KILN: SHED OVER THE EXTERIOR WEST FIRE BOX
(DETAIL – GOODHUE CO. HIST. SOC. 1.2.4187)**



FIGURE 21. VIEW INTO THE BRICK-LINED INTERIOR OF THE 1882 KILN'S EAST CHAMBER



FIGURE 22. VIEW OF THE TOP OF THE 1882 KILN'S WEST CHAMBER

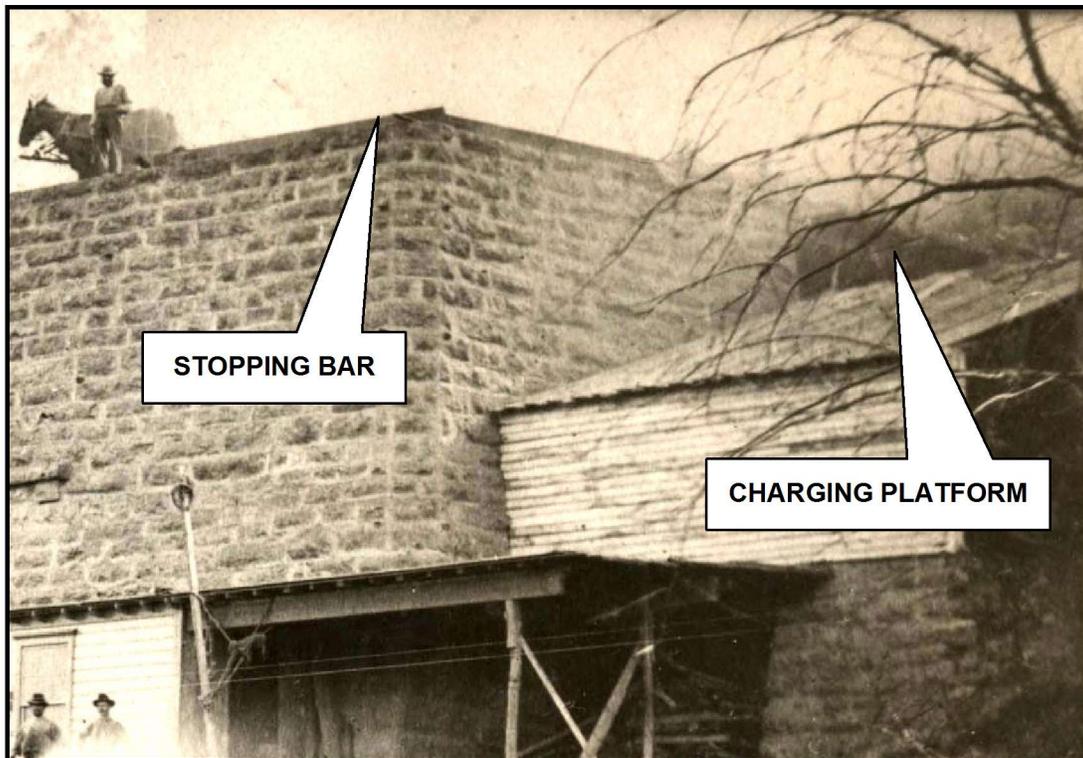


FIGURE 23. FEATURES OF THE 1882 KILN: PROBABLE CHARGING PLATFORM AND STOPPING BAR (DETAIL – GOODHUE CO. HIST. SOC. 1.2.4187)

On the bluff side behind the kiln there is a level work area where the loaded carts of stone would have arrived. An earthen embankment supported by retaining walls connects the roadway to the charging platform atop the kiln (see Figure 14). Historic photographs indicate that this area was augmented with bridge decking to create a wider charging platform (see Figures 19 and 23).

Lime House

Foundations around the extant kiln, document the lime house and depot that once wrapped around the three exposed sides of the kiln (see Figures 14, 19, and 24). This structure protected the kiln entrances and the caustic quicklime from the elements and provided space for packing the lime in barrels. The lower portion of the building fronting on the kiln's rail spur was a loading dock with a shed-roof that extended over the rail cars (Figure 25). The lime house had a stone first story and wood-clad upper stories and shed roofs. For a period of time after the kiln was abandoned and the wood portions of the lime works had been removed, the stone first-story of the lime works and the kiln's spur track remained (Figure 26). While portions of the stone walls that once formed the first story of the kiln's lime works remain, and additional subsurface portions may be preserved, this portion of the structure has since been removed (Figure 27).



FIGURE 24. LIME WORKS OF THE 1882 KILN (DETAIL – GOODHUE CO. HIST. SOC. 1.2.4187)

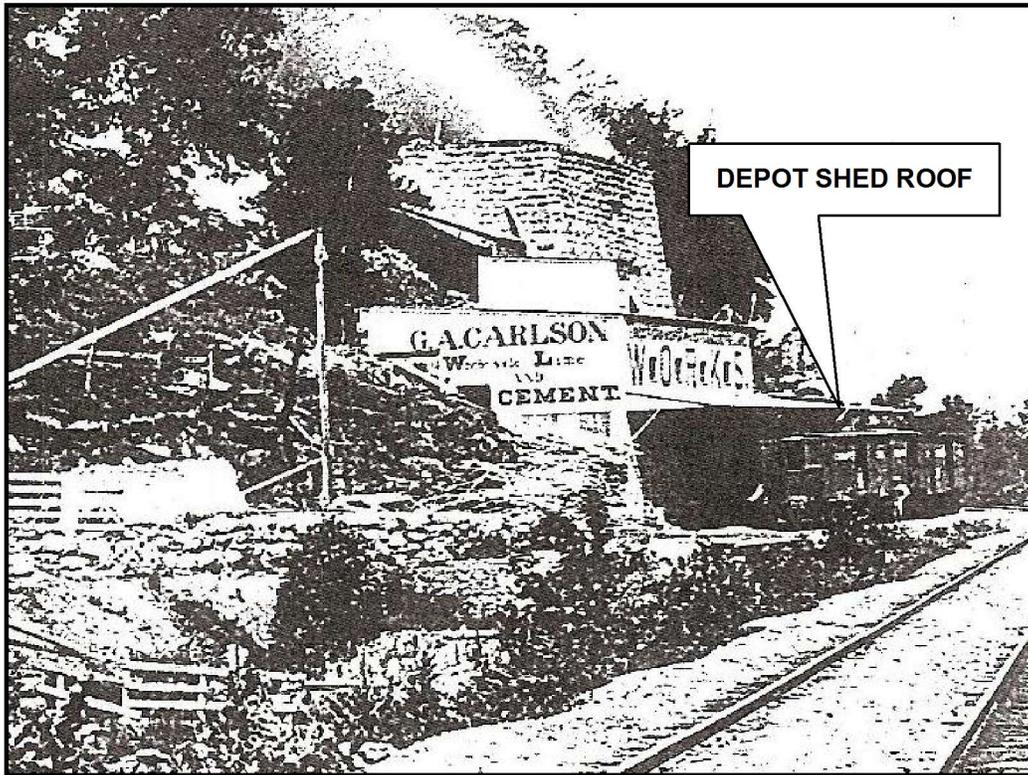


FIGURE 25. FEATURES OF THE 1882 KILN: DEPOT SHED ROOF
(DETAIL - GOODHUE CO. HIST. SOC. 1.2.4186)

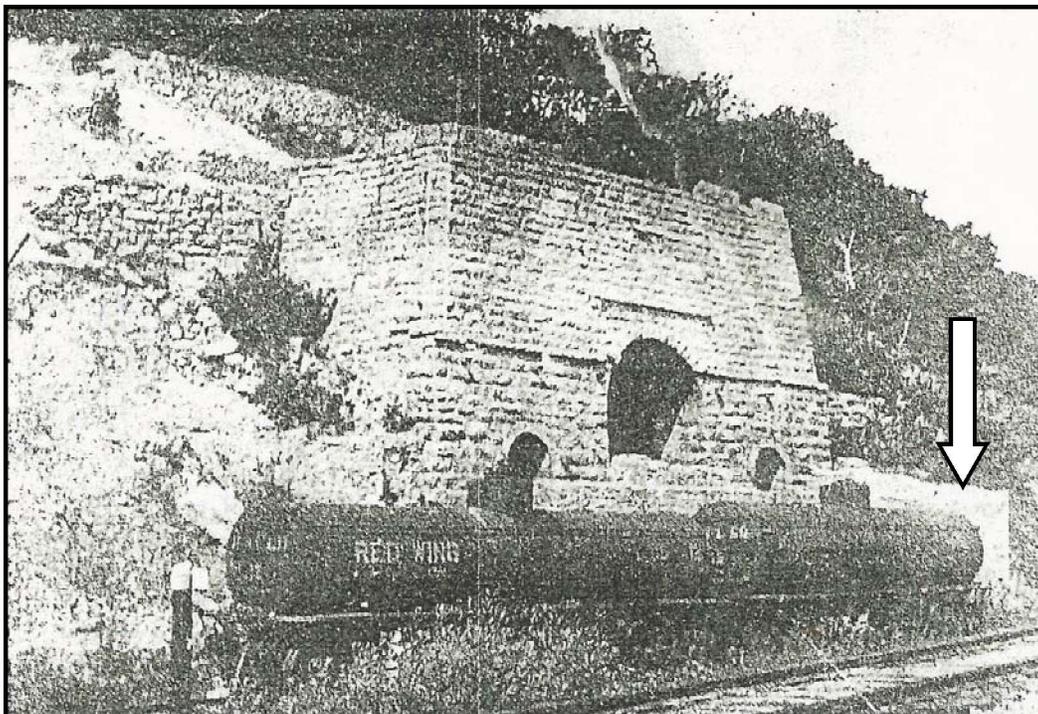


FIGURE 26. PRE-1973 IMAGE OF THE 1882 KILN SHOWING THE STONE FIRST STORY OF THE
LIME WORKS STILL PARTIALLY EXTANT (OIL CARS ARE PARKED ON LIME KILN SPUR TRACK)
(REPUBLICAN EAGLE, 12-29-73)

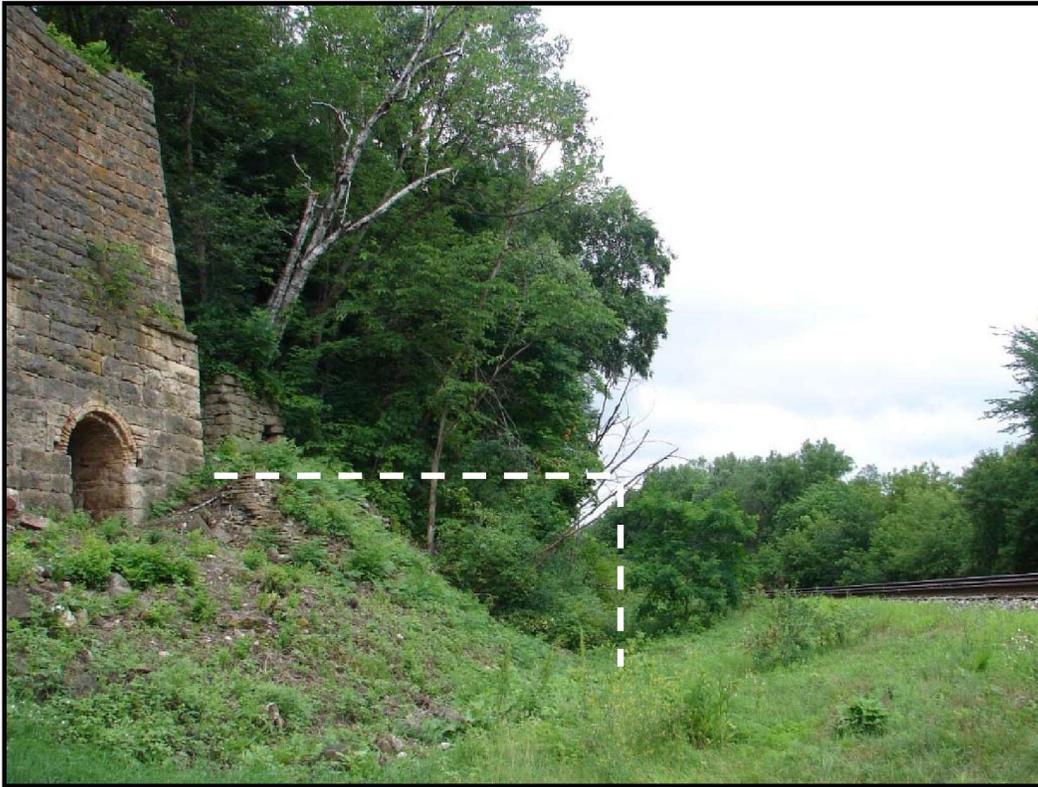


FIGURE 27. ILLUSTRATION OF LOCATION OF THE LIME WORKS FIRST STORY- SINCE REMOVED (DASHED LINE), VIEW TO NORTHWEST.

Tunnel Kiln

Located approximately half way up the bluff face, the Tunnel Kiln was Carlson's first kiln put in to operation on Barn Bluff (Figure 28). Constructed in 1872, it is the only kiln indicated on Barn Bluff on an 1874 map of Red Wing (Campbell 1874). This kiln utilized the natural topography of the bluff to create a kiln chamber and chimney. A horizontal tunnel was excavated into the bluff to access a vertical shaft into which the limestone was dropped from above. According to historical records, the kiln's vertical shaft was 90 ft. deep, while the horizontal tunnel was excavated 150 ft. into the bluff (*The Grange Advance*, 18 February 1874). The visible portion of the kiln consists of a limestone tunnel entrance (Figure 29). The visible portion of the arch at the tunnel entrance is approximately 6 ft. (1.83 m) wide and just over 6 ft. (1.9 m) in height. An iron hinge/pintle is located within the arch to the right of the entrance. The wall that forms the tunnel's face is about 17.5 ft. (5.33 m) long, 9.5 ft. (2.9 m) tall, and constructed of 2-ft. thick block. The tunnel passage is roughly 30 foot (9.13 m) in length to a point at which it is caved-in with rubble due to a twentieth century collapse (Lieberman 1973:14). On the bluff side above the kiln and at a distance of 35 ft. (10.7 m) back from the tunnel face, an approximately 20 x 13 ft. wide depression in the hillside marks the location of the tunnel collapse (Figure 30). On the east edge of Carlson's quarry atop barn bluff, a distinct depression marks the apparent upper entrance to the tunnel kiln (Figure 31). This location is at the correct distance, elevation, and bearing to be the tunnel kiln's entrance.

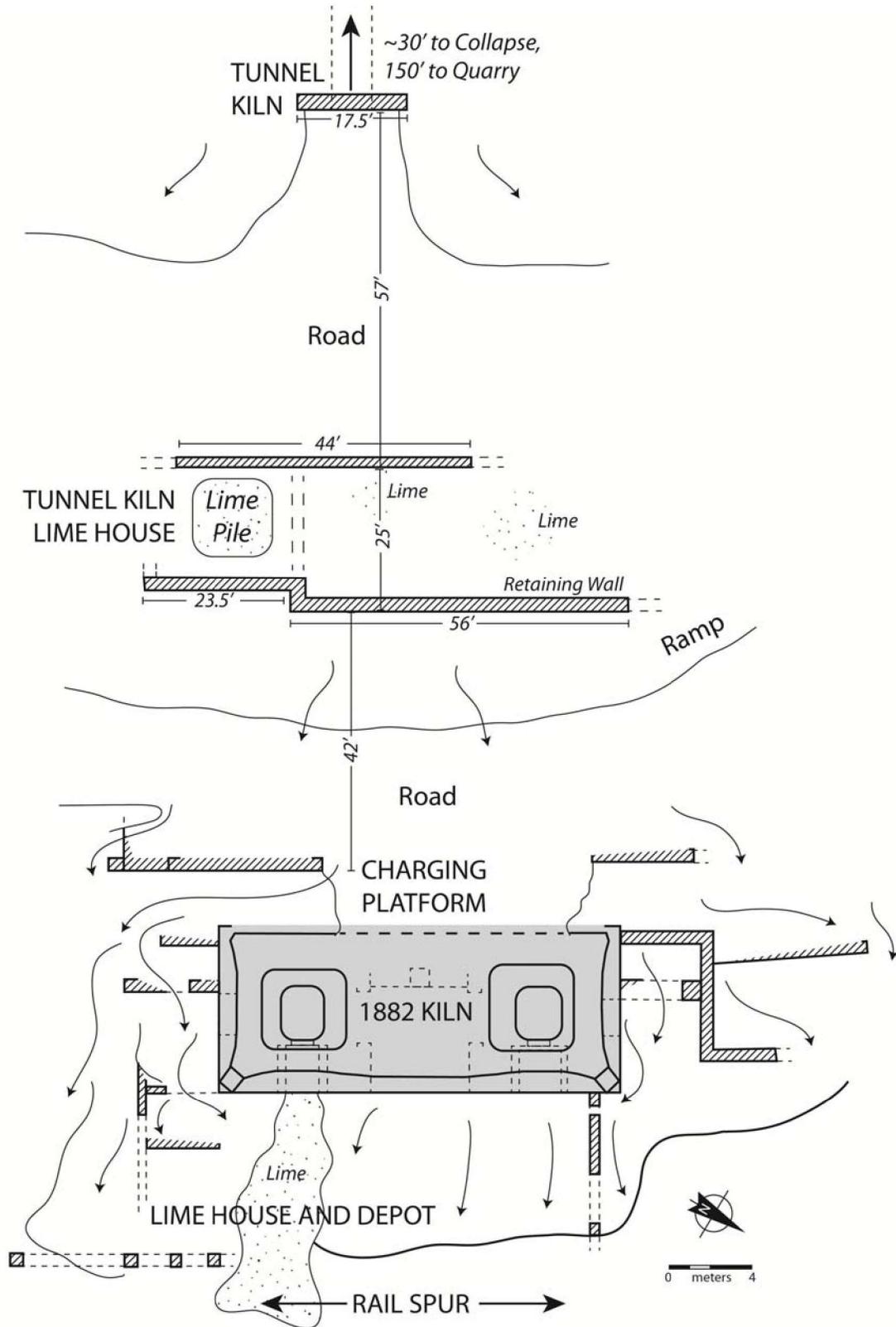


FIGURE 28. PLAN OF 1882 KILN AND TUNNEL KILN FEATURES



FIGURE 29. TUNNEL KILN ENTRANCE



FIGURE 30. TUNNEL KILN ENTRANCE WITH UPSLOPE COLLAPSE INDICATED

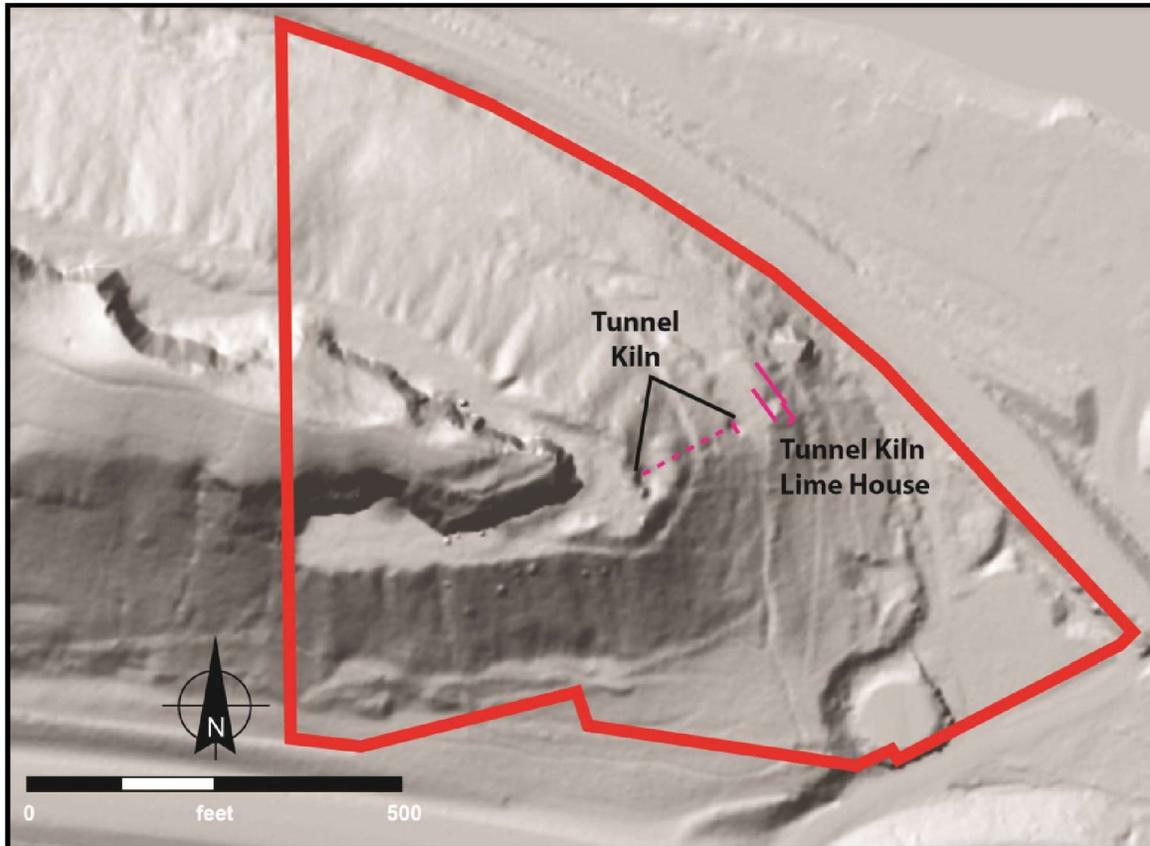


FIGURE 31. LOCATION OF TUNNEL KILN AND ASSOCIATED LIME WORKS ON LIDAR IMAGE

Tunnel Kiln Lime House

Just as the 1882 kiln had a lime house in which the quicklime was sheltered and put into barrels, the tunnel kiln apparently had a similar companion structure. Information about the nature of this structure is limited. A series of retaining walls and foundations associated with a level terrace in front of the tunnel kiln mark the location of this former structure (see Figures 28 and 32). A 10 x 12 ft. pile of lime within the foundations bears testimony to the stockpiling of quicklime at this location. According to the available historic images, this structure was built of stone and like the lime house below had windows on the side facing the river (MHS Neg. No. 2903-B) (Figure 33).

Quarries

It was the quarrying of the limestone of which Barn Bluff and neighboring Sorin's Bluff are comprised that spurred the development of the lime industry at Red Wing. While the best block was quarried for building stone, smaller fragments were reduced to lime. At one time three quarries were in operation on Barn Bluff, each supplying stone to its associated kilns (Carlson, Linne, and Twin City Lime and Cement). Carlson's quarries were located upon his holdings within Government Lot 4 and wrapped around the upper portion of the east end of the bluff (Figure 34). The removal of stone from these quarries



FIGURE 32. UPPER RETAINING WALL ASSOCIATED WITH THE TUNNEL KILN'S LIME HOUSE, VIEW TO SOUTH

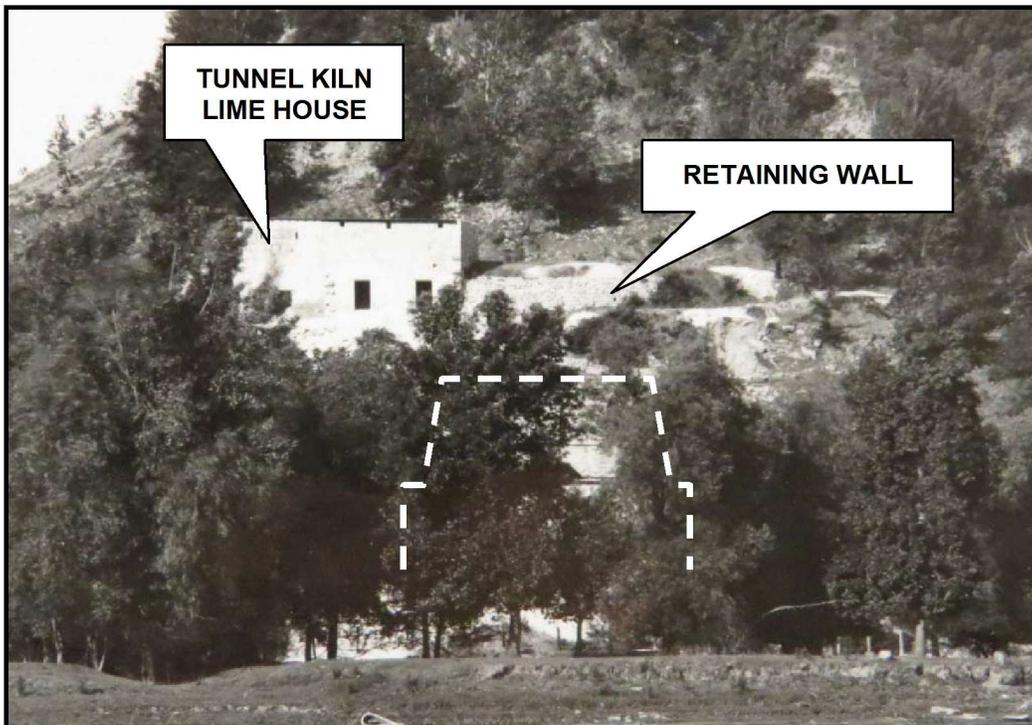


FIGURE 33. DETAIL OF 1900 PHOTOGRAPH SHOWING THE PRESUMED TUNNEL KILN'S LIME HOUSE ABOVE THE 1882 KILN (DASHED OUTLINE)

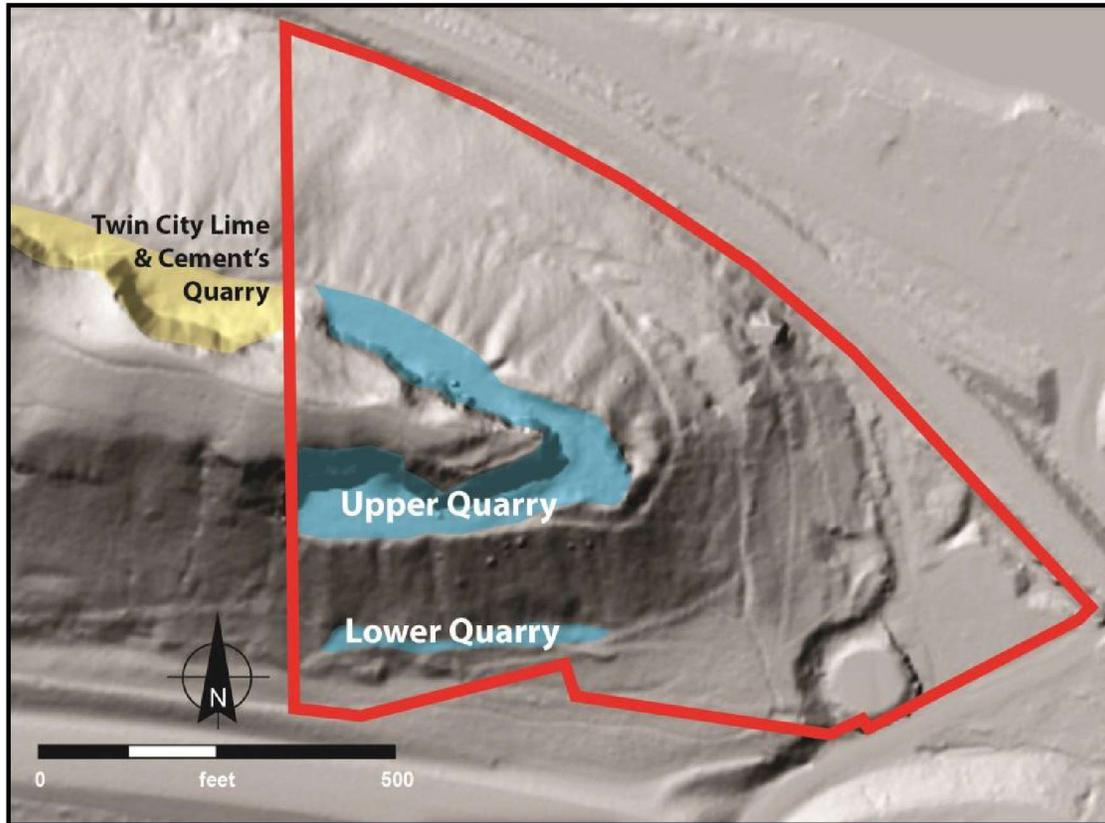


FIGURE 34. CARLSON QUARRY LOCATIONS ON LiDAR BASE MAP

created the distinct boat prow shape of Barn Bluff's east end (MHS Neg. No. Runk 1347) (Figure 35). Today the walls of these former limestone quarries draw recreational climbers to Barn Bluff (Figure 36).

During the fieldwork a smaller quarried area was documented on the lower portion of the south side of the bluff (see Figure 34). It is not possible to discern the age of this quarry, but given that it is documented on the 1938 aerial photograph, located within the boundary of Carlson's parcel, and connected to the kilns by a road, it is likely related to Carlson's operations.

One of the other features of the quarry area noted during the fieldwork was a channel cut into the bluff edge and at grade with the quarry floor (Figure 37). This feature is 37 ft. (11.28 m) long and 9 ft. (2.75 m) wide. The approximate depth of the channel is 6.5 ft. (1.98 m). Some large limestone blocks are present proximate to the south end of this channel at the quarry's edge. The function of this channel is unclear, but given that a scar is visible on the LiDAR directly below the channel and connecting to the road below, this was likely a point at which large limestone block was lowered down the bluff face rather than carted (Figure 38). Carlson is known to have used this process on Sorin's Bluff (*The Grange Advance*, February 18, 1874).

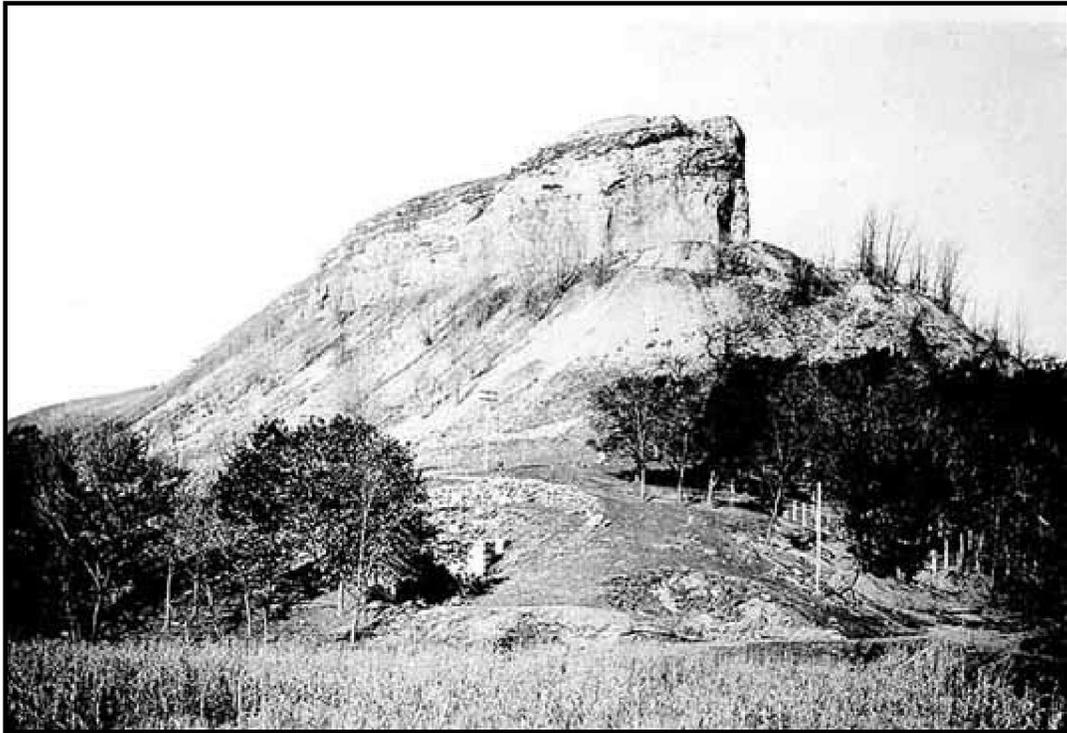


FIGURE 35. BARN BLUFF'S QUARRIED EAST END, VIEW TO NORTH C. 1895



FIGURE 36. QUARRY WALL AND FLOOR ON NORTH SIDE OF BARN BLUFF



FIGURE 37. CHANNEL LEADING OFF OF NORTH QUARRY, VIEW TO NORTHEAST

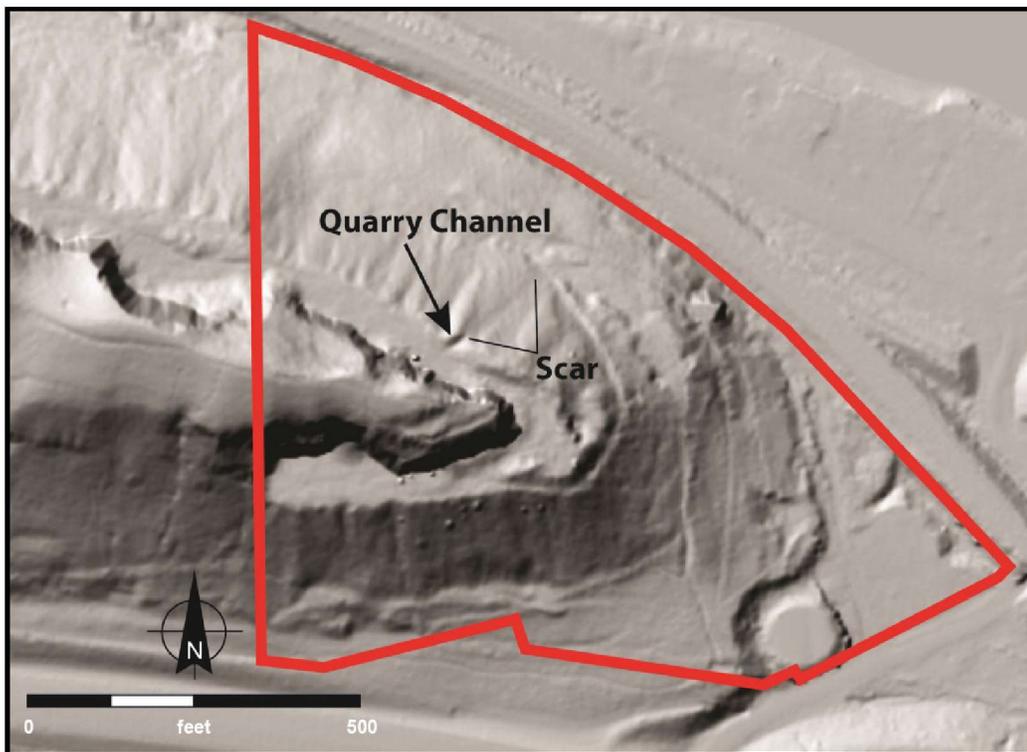


FIGURE 38. QUARRY CHANNEL AND SCAR BELOW IT ON LIDAR IMAGE

Stone / Lime Yard

To the southeast of the 1882 Kiln, and along the rail spur that serviced the Carlson lime works, is an approximately 30-ft. wide, flat area defined by two retaining walls (Retaining Walls 2 and 3) and approached by a roadway from the southeast (see Figure 13). This area is separated from the main kiln complex by an outcropping of natural bedrock. According to historic images of the kiln, this level area was fenced and featured a braced pole derrick (Figures 39-40). Given the presence of the pole derrick, the access to this area by a road that linked the site to Red Wing, and the staged wagon in a c. 1882 historic photo, it is presumed that this area was used as a stone yard and lime loading area for local purchase.

Retaining Wall 2 – Between Spur Track and Stone /Lime Yard

This wall constructed of limestone is located approximately 17.5 ft to the west of the railroad spur alignment (Figure 41). The visible portion of this wall is 73 ft. long and it is 3.5 ft. in height. The wall is 15 in. deep. To the rear of the wall is a 30-ft. wide level area.

A 12 x 12 ft concrete slab and two parallel linear concrete foundations of 26 ft. in length are located proximate to the wall, although they post-date its construction and the operation of the kiln. These features and their relationship to the former rail spur suggests they may have been part of a fuelling depot or other railroad maintenance structure.

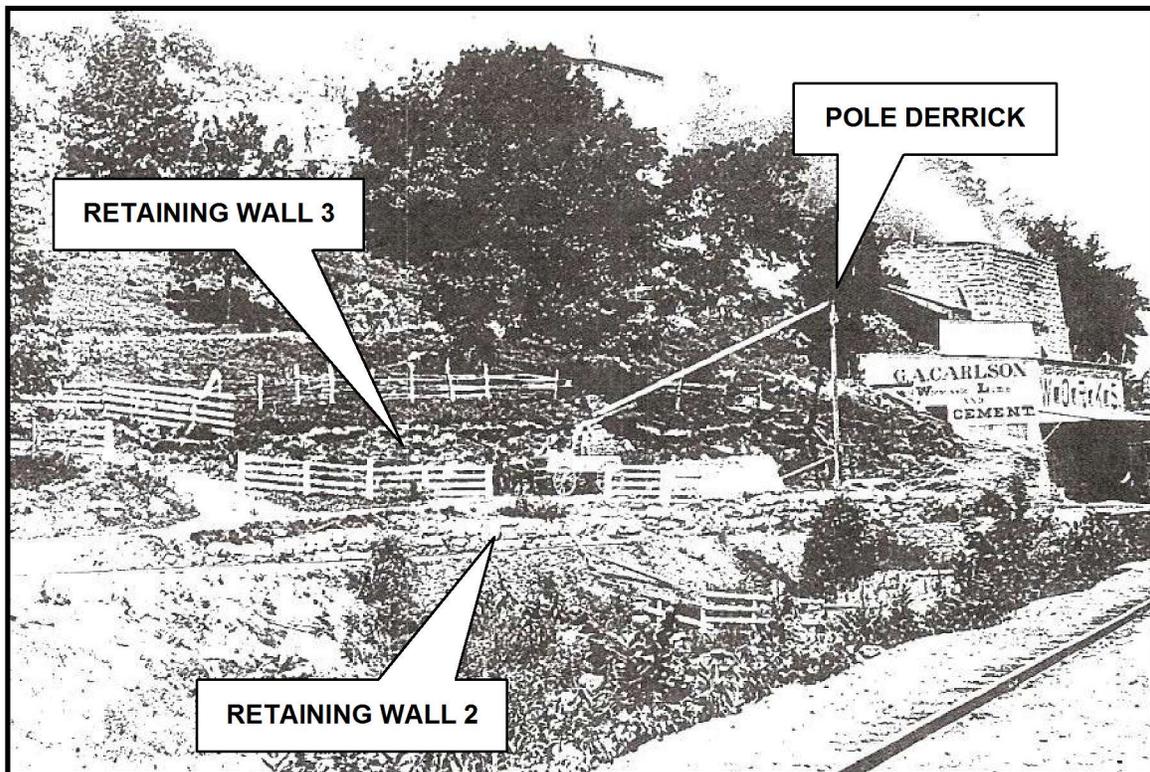


FIGURE 39. STONE / LIME YARD (DETAIL - GOODHUE CO. HIST. SOC. 1.2.4186)



**FIGURE 40. POLE DERRICK WITH BRACING VISIBLE ABOVE RAIL CARS
(DETAIL – GOODHUE CO. HIST. SOC. 1.2.4187)**



**FIGURE 41. PORTION OF LIMESTONE RETAINING WALL 2 BETWEEN THE RAIL SPUR
(FOREGROUND) AND STONE YARD (BACKGROUND), VIEW TO SOUTHWEST**

Retaining Wall 3– Bluff Side of Stone / Lime Yard

Separated by a distance of 30 ft. from Retaining Wall 2 is another limestone retaining wall (Figure 42). Only a 10 ft. long section of this wall is visible. The wall is 3 ft. in height and 15 in. thick.



FIGURE 42. PORTION OF RETAINING WALL 3, VIEW TO SOUTHWEST

Spur Track

Prior to 1875, the Milwaukee and St. Paul Railway constructed a spur track to service the lime works. This track diverged from the main line just to the west of the 1882 Kiln and arced around the bluff base to the southeast (Foote and Henion 1894)(Figure 43). From approximately the city's pump house north, the Carlson Lime Kiln Trail follows the alignment of this former rail spur, which is now a 16-ft wide gravel access road (Figure 44).

Roads

The quarries on the upper portion of Barn Bluff were connected to the kilns below by a series of roads down which the stone was carted (Figure 45). Roads also connected the kilns to the end of East Third Street and so Red Wing proper. Portions of these roads, which were cut into the hillside, are now incorporated into the North and Midland trails, while other segments are overgrown, but still discernible. Small segments of two roads to the north of the pump house have been removed either through slumping of the hillside or borrow activities. Another segment to the west of the water reservoir and near the junction of the Midland and North Trails is indistinct.

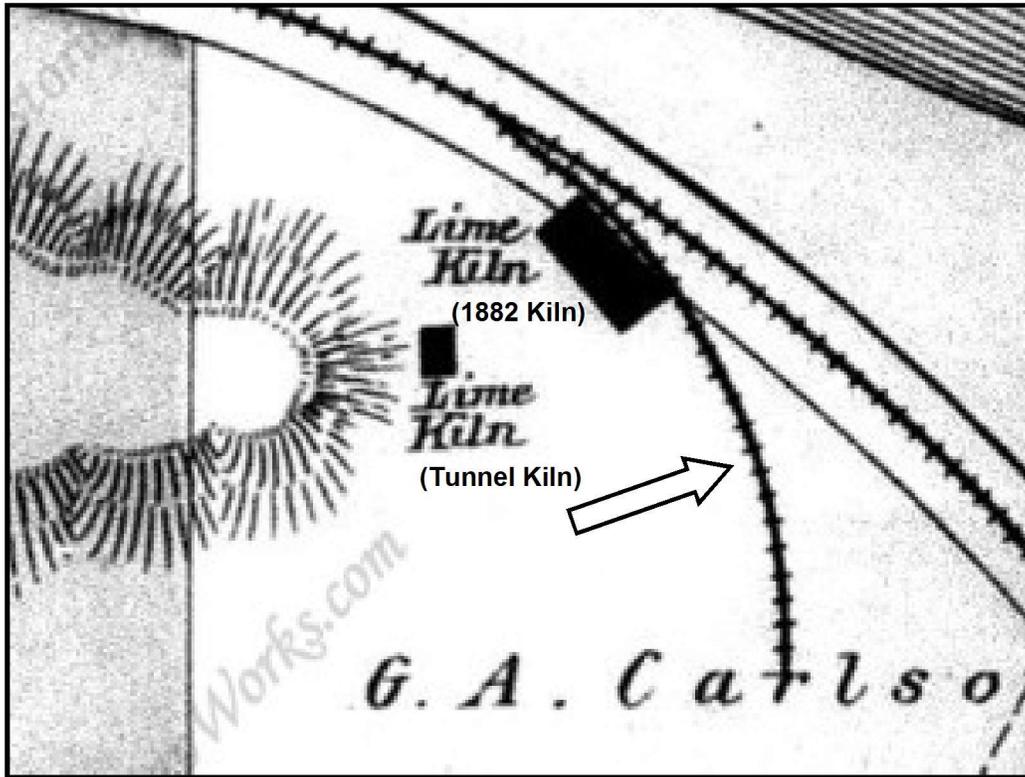


FIGURE 43. THE SPUR TRACK ILLUSTRATED ON AN 1894 MAP



FIGURE 44. RAIL SPUR ALIGNMENT, VIEW TO SOUTHEAST TOWARDS PUMP HOUSE

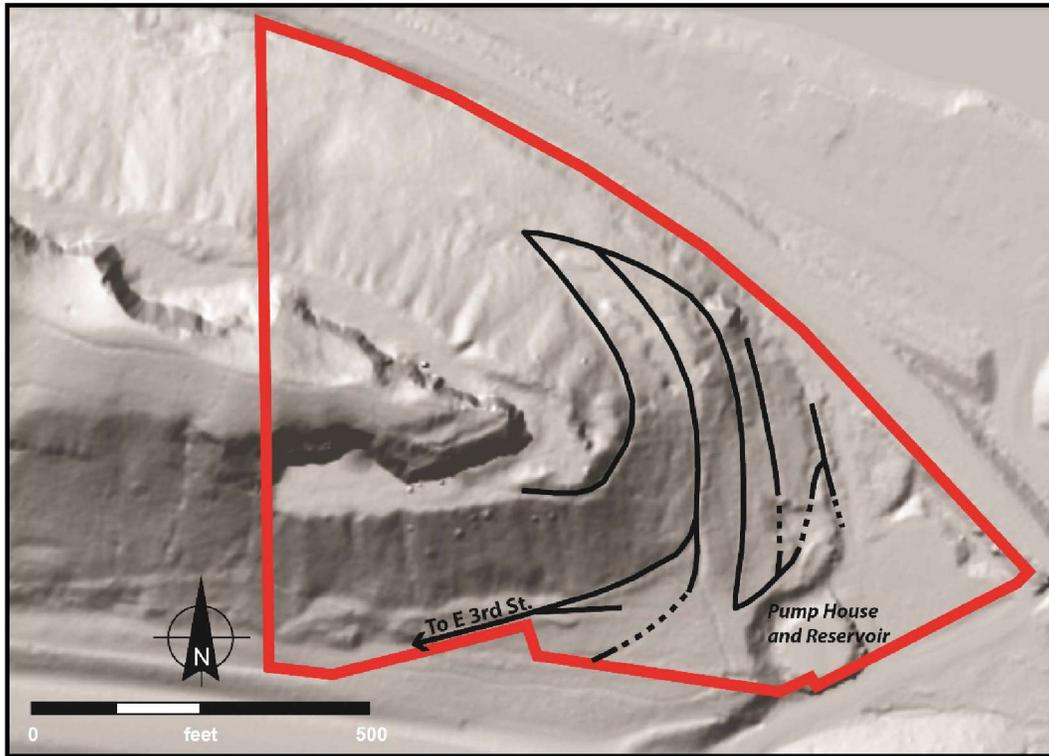


FIGURE 45. ROADS ASSOCIATED WITH THE CARLSON LIME WORKS ON LiDAR IMAGE

Retaining Walls

Due to the steep slopes of Barn Bluff upon which the lime works was constructed, retaining walls were constructed of limestone both immediately around the kilns, but also along the roads that climbed the bluff. The retaining walls contiguous to the kilns and the stone yard have been previously discussed, while independent walls are described below.

Retaining Wall 1 – To West of Spur Track Alignment

This 23-ft long, 50-in high retaining wall is located to the west (13.5 ft.) of the rail spur alignment and to the north of the pump house (see Figures 13 and 46). The chisel-faced limestone block and the style of the wall's pointing is identical to the construction of retaining walls to the rear of the pump house and does not resemble the walls associated with the Carlson lime works. This wall was apparently constructed in conjunction with the water works during the first part of the 20th-century and should not be considered part of the lime works.

Midland Trail – Retaining Wall A

This limestone retaining wall supports a portion of the roadway near the lower quarry and leading to East 3rd Street, which is now part of the Midland Trail (see Figures 13 and 47). This wall is 20 ft. long, 3 ft. tall, and 1 ft. thick.



FIGURE 46. PORTION OF 20TH CENTURY RETAINING WALL 1, VIEW TO WEST



FIGURE 47. PORTION OF MIDLAND TRAIL RETAINING WALL A, VIEW TO NORTH



FIGURE 48. NORTH TRAIL RETAINING WALL A, VIEW TO SOUTHWEST

North Trail – Retaining Wall A Along the Quarry Road

This short segment of limestone retaining wall is visible on the side of the bluff between the road leading to the quarry (North Trail) and the quarry above (see Figures 13 and 48).

G. A. Carlson Lime Kiln Interpretive Marker

An interpretive marker constructed in 2003 of limestone is located to the immediate northeast of the intersection of East 5th Street and the Carlson Lime Kiln Trail / Pump House access (see Figures 13 and 48). While this feature is not historic, it is directly related to the kiln and located within the boundary of 21GD0297.

SYNTHESIS

The intensive literature search and archaeological investigation of the G. A. Carlson Lime Kiln (GD-RWC-20) revealed that it is one element of the much larger industrial complex that was Carlson's Red Wing Pioneer Lime Works on Barn Bluff. These operations included a series of kilns, together with the roadways that connected the kilns to quarries on the upper portion of the bluff, a devoted rail spur, and other ancillary features (see Figure 13). These archaeological remains and landscape features are considered significant because Carlson's lime works was among the earliest and most successful of



FIGURE 49. G. A. CARLSON LIME KILN INTERPRETIVE MARKER

Red Wing's lime industries. Furthermore, these resources illustrate the importance of the limestone industry to the development of the community, and the manner in which limestone was quarried and the technology of turning it into lime. While information on G. A. Carlson and the development of his business are provided in secondary documents on the history of Red Wing and its lime industry, these resources do not provide any specific information on the layout and construction of the kilns. Furthermore, photographs and historical maps of the site are limited. As a result, the archaeological remains and landscape features related to the lime works are the principal means of understanding the layout of Carlson's historically-significant complex and its operation.

Significance

The site of the G. A. Carlson Pioneer Lime Works on Barn Bluff (21GD0297) illustrates the locally-significant lime industry that contributed to Red Wing's commercial growth and had a literal lasting impact on the city's landscape (Criterion A), as well as provide information important to our understanding of the technology of turning limestone into lime (Criterion D).

Period of Significance

The period of significance for 21GD0297 begins in 1872 when Carlson constructed his first lime kiln on Barn Bluff, although he may have begun quarrying the bluff earlier, the lime works began the kiln. The period of significance ends in 1908 when quarrying ceased. The City of Red Wing took ownership of the site in 1910. The period of significance in the current National Register nomination is 1882 (possibly 1882-

1907/1908) (Kunau 1975). Not only should the nomination be revised to an historic district, but the period of significance should be expanded to 1872-1908.

Integrity

The archaeological survey of 21GD0297 revealed the presence of intact foundations and other features associated with the G. A. Carlson Red Wing Pioneer Lime Works on Barn Bluff. Impacts to the archaeological components of the lime works have principally resulted from erosion and the widening of the CP Railway's corridor, however, these effects have not substantially altered the site's integrity. Rather, because the site area has undergone very little activity since the closure of the complex, it retains good integrity of location, materials, and association.

Site Boundaries

The boundary of the G. A. Carlson Red Wing Pioneer Lime Works (21GD0297) is that portion of Government Lots 3 and 4 within the boundary of Barn Bluff Park owned by the City of Red Wing (PIN 556100080). This boundary corresponds to that portion of Barn Bluff that was owned by Carlson. The 15.6 acre boundary encompasses all of the elements of the lime works including the Tunnel Kiln, the 1882 Kiln, lime sheds, the stone quarry, the stone yard, roads, associated retaining walls, and the rail spur that serviced the kiln. It also encompasses the interpretive marker for the kiln.



FIGURE 50. BOUNDARY OF SITE 21GD0297 ON CITY PARCEL MAP (2012 AERIAL)

INTERPRETIVE POTENTIAL

The G. A. Carlson Red Wing Pioneer Lime Works site (21GD0297) is located within the City of Red Wing's Barn Bluff Park. These resources, like those recently interpreted by the City in Memorial Park on Sorin's Bluff, illustrate the importance of the limestone industry to the development of Red Wing. Several passersby during the archaeological investigation expressed an interest in how the kilns worked and interpretive markers proximate to the tunnel and 1882 kilns could illustrate that process. Furthermore, trail segments that follow the historic routes between the kiln and the quarries and the quarry works themselves could be signed to share with hikers and climbers, the principal users of Barn Bluff, the direct historical connection between the bluff's past and its current landscape. To that end, it is recommended that the City of Red Wing develop an interpretive plan for Barn Bluff that highlights this significant aspect of the City's past.

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SUMMARY AND RECOMMENDATIONS

In June and July of 2014, Two Pines conducted an intensive literature search and archaeological investigation of the G. A. Carlson Lime Kiln in support of an Historic Structure Report (HSR) being prepared for the kiln. This work was performed for the City of Red Wing (the City), which funded the project in part with a grant from the State of Minnesota's Arts and Cultural Heritage Fund. MacDonald & Mack Architects, the lead consultant, prepared the HSR.

The G. A. Carlson Kiln structure (GD-RWC-20) was listed on the National Register of Historic Places in 1976, but had not previously undergone an archaeological investigation. The purpose of the archaeological study was to define the extent of subsurface features of the associated lime works and to locate archaeological deposits related to the kiln, its workers, and/or functions. The kiln is located on city property within Barn Bluff Park, which is an approximately 43 acre (17.4 hectare) area bound on the west by the TH 63 corridor to the west, on the south by the TH 61/63 corridor, on the east by East 5th Street, and on the north by the Canadian Pacific (CP) Railway right of way. The kiln is located on the northeast corner of the bluff in the in the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 29 of Township 113N, Range 14W.

The operation of the G. A. Carlson Red Wing Pioneer Lime Works on Barn Bluff consisted of not one, but multiple kilns, together with roadways that connected the kilns to quarries on the upper portion of the bluff, a devoted rail spur and other ancillary features that together formed a single industrial complex. During the current investigations of 21GD0297, intact archaeological features (e.g., foundations) and other landscape elements of this historically-significant industry were documented within that portion of Government Lots 3 and 4 owned by Carlson and located within the boundary Barn Bluff Park. Given that the area has undergone very little activity since the closure of Carlson's enterprise, and principal threats have been limited to erosion, climbing enthusiasts, and disturbance immediate to the CP Railway corridor, the site retains good integrity of location, materials, and association.

Together the documented archaeological and landscape features illustrate the locally-significant lime industry that contributed to Red Wing's commercial growth and which had a literal lasting impact on the city's landscape (Criterion A), as well as provide information important to our understanding of the technology of turning limestone into lime (Criterion D). The National Register listing for the G. A. Carlson Lime Kiln should be updated to reflect these findings including revising the period of significance (1872-1908), broadening the contributing resources, and updating the property's boundary. The 1882 kiln is also presently outside the boundary of the Barn Bluff National Register Historic District. It is recommended that the boundaries of the Barn Bluff Historic District be revised and the areas of significance expanded to include the stone quarrying and lime manufacturing industries, the history of which is integral to the formation and eventual preservation of Barn Bluff's present cultural landscape (Two Pines 2014).

Subsurface impacts within the site boundary should be avoided. If archaeological site 21GD0297 will be impacted by park development plans or kiln stabilization measures, the appropriate level of treatment for the effected cultural resources should be determined in consultation with the State Historic Preservation Office.

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APPENDIX C

UTM COORDINATES OF IDENTIFIED FEATURES

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

BARN BLUFF HISTORIC DISTRICT				
UTM Coordinates of Individual Features (Zone 15, NAD 1983)				
<i>Feature</i>	<i>Easting</i>	<i>Northing</i>	<i>Notes</i>	
Natural Systems and Features				
East Overlook	538044	4935205	Natural rock outcrop	
“Indian Head”	Destroyed		Removed for Hwy 63 bridge, 1958-60	
West Overlook (natural)	Destroyed		Removed for Hwy 63 bridge, 1958-60	
Circulation				
Citizen’s Memorial Stairway (West Kiwanis Stairway)	(bottom)	537182	4935235	Built 1929, partially destroyed 1958-60
	(top)	537191	4935226	
East Kiwanis Stairway	(bottom)	538171	4935074	Built 1976 with steps from 1929 stairway
	(top)	538145	4935089	
Central Kiwanis Stairway	(bottom)	537469	4935170	Built 1982, benches are steps from 1929
	(top)	537501	4935220	
Structures				
G. A. Carlson Lime Kiln	538147	4935249	Built 1882, National Register listed	
Tunnel Kiln	538113	4935229	Began operation in 1872	
Pump House No. 2 (control bldg.)		538202	4935120	Pre-1938
	(reservoir)	538187	4935098	
Kiosk/Shelter	538148	4935081	Built 2003; benches c.1976	
West Overlook (2014)	537195	4935223	Built 2014	
Small-Scale Features				
Flagpole Base	537286	4935241	Installed 1929	
Flagpole	537282	4935213	Erected 2011	
Limestone Walls (Kiln/Quarry)	Various		Contributing to 21GD297	
East 3rd Street Residential Features	Various		Occupied late 19 th century – c. 1959	
<i>Cistern</i>	537828	4935119	Within East 3 rd Street neighborhood	
National Geodetic Survey Marker	537288	4935239	Established 1893, reset 1990	
Interpretive and Directional Signage				
<i>Park Entrance Sign</i>	538177	4935076	Installed 2003	
<i>Kiwanis Stairway (East)</i>	538153	4935086	Installed 1976	
<i>Mt. La Grange – Barn Bluff</i>	538143	4935086	Installed 1978	
<i>Kiwanis Stairway (Central)</i>	537467	4935164	Installed 1982	
<i>Barn Bluff</i>	538172	4935083	Installed 1989	
<i>G. A. Carlson Lime Kiln</i>	538221	4935106	Installed 2003	

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

BARN BLUFF HISTORIC DISTRICT			
UTM Coordinates of Individual Features (Zone 15, NAD 1983)			
<i>Feature</i>	<i>Easting</i>	<i>Northing</i>	<i>Notes</i>
Quarries (central points)			
G. A. Carlson Quarry (north)	538017	4935222	Commenced quarrying c.1870
(south)	537984	4935171	
F. J. Linne Quarry	537452	4935196	Commenced quarrying c.1879
Twin City Lime and Cement Quarry	537832	4935288	Commenced quarrying 1880
Archaeological Resources			
Earthworks/Burial Mounds (21GD15)	Restricted Information		Three earthworks recorded in 1885
G.A. Carlson Red Wing Pioneer Lime Works (21GD297)	Restricted Information		Archaeological features associated with the G. A. Carlson Lime Kiln (1882) and associated lime works
21GDq (Found Object)	Unknown		Long rifle discovered in 1870

APPENDIX D
HABITAT MANAGEMENT PLAN

BARN BLUFF NATIONAL REGISTER HISTORIC DISTRICT
CULTURAL LANDSCAPE REPORT

Habitat Management Plan for City of Red Wing Parks: Barn Bluff



Prepared by:

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Upper Mississippi National Wildlife
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Room 203
Winona, MN 55987

Introduction

Barn Bluff is located on the northeast side of Red Wing, Minnesota (Map 1) and is considered by many city residents as a historical landmark. Barn Bluff is best described as a high knob or knoll with steep to very steep slopes and a relatively flat, narrow ridgetop (Map 2). The top of the bluff overlooks the Mississippi River to the north and the city of Red Wing to the south and southwest. Total park acreage is 73 acres, although the steep slopes add significant acreage for management purposes. Concrete steps, a kiosk, flagpole, and several hiking trails are the only developments within the park. This park and trail system receives heavy public use.

Human activities have altered the character and vegetation communities present on the bluff. Portions of the bluff have been removed by the operation of several quarries during the late 1800's, predominantly on the east end and the western portion of the south slope. The north flank was altered by construction of the railroad in the 1870's. Construction of Highway 61 and the approaches for the Eisenhower bridge removed portions of the south and west sides. These activities resulted in the exposure of limestone bedrock and nearly vertical rock faces at several locations on the bluff. Fire suppression has also altered the vegetation communities on the bluff. It is likely the entire south slope was historically prairie and oak savanna, but fire suppression has allowed woody vegetation to become established at several locations including the entire lower slope. These woody species continue to spread and encroach on the existing prairies and oak savanna. Presently, approximately 23 acres of Barn Bluff is bluff prairie and oak savanna, with some rock outcropping. The remainder of the park is deciduous forest, or is becoming established as deciduous forest.

Despite these alterations, Barn Bluff provides important wildlife habitat. Minnesota has lost most of its native tall grass prairie and oak savannas, and these plant communities are among the rarest in the U.S. The prairies and oak savanna on Barn Bluff are still of high quality and of large enough size to provide habitat for grassland and savanna bird species, reptiles, and insects. The deciduous forests provide habitat for forest bird species, mammals, reptiles, amphibians, and insects.

For management purposes the park is best divided into 7 areas: 1) west prairie, 2) east prairie, 3) oak savanna, 4) oak grove, 5) south prairie, 6) south forest, and 7) north forest (Map 3). The prairies and oak savanna are of high quality, but are threatened by invasion by woody species. The oak grove and south prairie have been extensively invaded by deciduous woody vegetation and will succeed into deciduous forest within 20 years. The south forest was likely oak savanna and prairie prior to fire suppression. It is now a mixed species deciduous forest that is badly invaded by the exotic species buckthorn and honeysuckle. The north forest is predominantly a mature maple-basswood forest with little to no exotic species invasion.

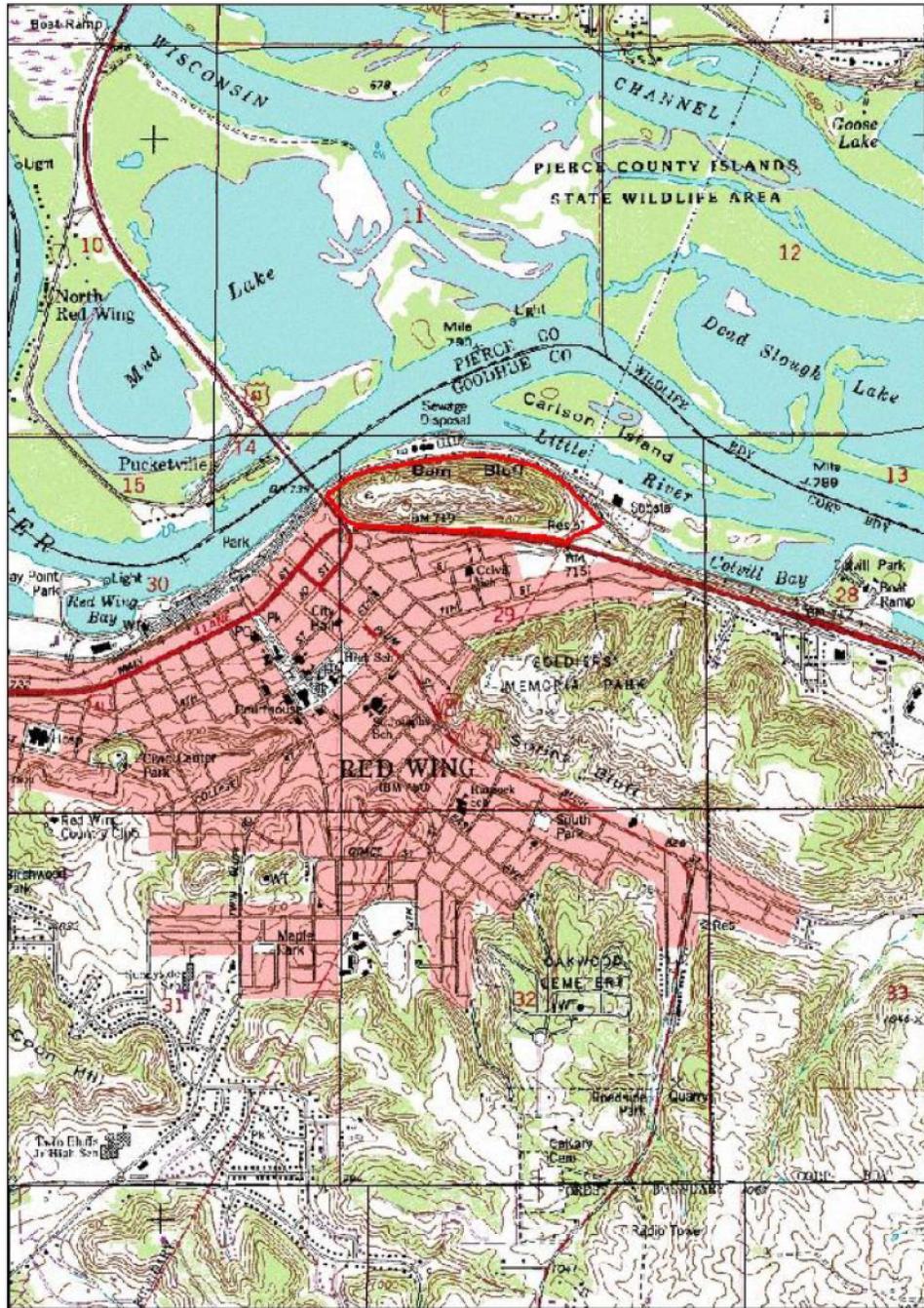
Management priorities for Barn Bluff are 1) maintain and restore open habitat types (prairies and oak savanna), and 2) control exotic species, primarily buckthorn and honeysuckle. On the following pages are descriptions of each area with management recommendations.



Map 1. Location of Barn Bluff on northeast side of Red Wing, Minnesota.

Red Wing Topo Quad

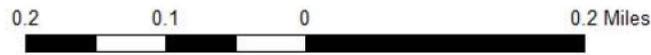
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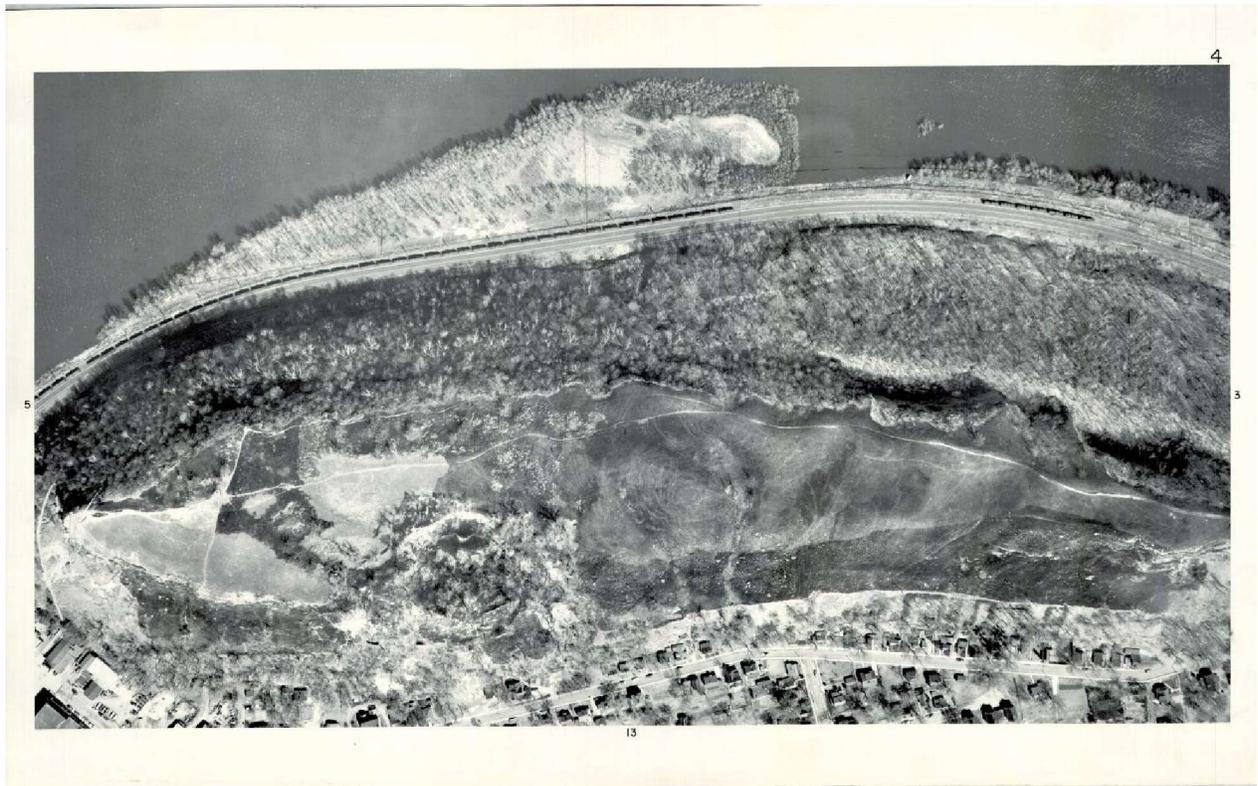
Map 2. Topographic map for Barn Bluff.

City of Red Wing Barn Bluff Park

Section 29 T113N R14W
Goodhue County, Minnesota



Map 3. Management units for Barn Bluff Park



Map 4. 1953 Aerial photograph of Barn Bluff showing the openness of the south slope. Note that most of south slope had burned shortly before the photo was taken.

West Prairie (4 A) and East Prairie (13 A)



The west prairie and east prairie are located along the ridgetop and upper portions of the south facing slope. Soil types are Timula silt loam (TmC), Timula-Bold silt loams (ToD), and Brodale-Sogn flaggy loams (BoF). Slopes vary from relatively flat on the narrow ridgetop to very steep (up to 80%) as one descends on the east prairie. Prairies are of relatively high quality with numerous grass and forb species present (See Appendix 1). Porcupine grass, big bluestem, little bluestem, side oats grama, purple prairie clover, and lead plant are especially abundant. Bladderpod, a Minnesota state endangered plant, has been found on the east prairie. An excessive amount of litter has built up throughout much of the prairie.

Invasion by woody species is the greatest threat to the persistence of these prairies. Sumac is the biggest problem, invading at several locations within the prairie in dense stands. Quaking aspen is invading into the prairie from the north forest/oak savanna edge, and is especially severe in the northwest corner of the west prairie. Approximately 3 acres of dense sumac and 0.1 acres of relatively dense aspen are present, with individuals of each species scattered along the north edge. Silver buffaloberry, a shrub native to far western Minnesota, has become established and is spreading in the southeast corner of the west prairie. Buckthorn, honeysuckle, and deciduous trees are invading up the slope from the south and east.

In addition to the woody species, a dense stand of sweet clover has developed along the prairie trail within the east prairie and is spreading south down the slope. This stand is estimated at 0.6 acres. Smooth brome grass has become established within some of sumac stands on the prairie.

Grassland bird species that utilize bluff prairies include grasshopper sparrows, eastern meadowlarks, bobolinks, and dickcissels. Reptiles found on bluff prairies include eastern hognose snakes, North American racers, gopher snakes, timber rattlesnakes, and six lined racerunner. Numerous butterfly, wasp, bee, and other insect species feed on flowering plants on bluff prairies.

Management Goals:

- 1) Maintain prairie acreage by controlling and removing woody vegetation.
- 2) Maintain native prairie grass and forb species diversity.

Management Recommendations (See Appendix 2 for species specific control methods):

- 1) Remove aspen, sumac, silver buffaloberry, and other non-oak woody vegetation from prairies.
- 2) Control sweet clover.
- 3) Monitoring and follow-up treatment of invasive species will be required for several years.
- 4) Use prescribed fire on a 3 to 5 year rotation to help control woody species invasion and remove excessive litter buildup. To protect insects and other fauna, it would be best to burn east and west prairies (or other suitable division) in different years. Timing of burns should vary for different years (ie early spring, late spring, summer, or fall) to promote diversity of plant species. When possible, prairies should be burned in conjunction with the oak savanna. Although the trails would make natural firebreaks, portions of the prairies and oaks savannas lie outside the trails and it would be best to burn beyond the trail to include all prairie/oak savanna vegetation communities.

Limitations/hindrances to management: Although slope is steep, it should not impede management activities. Prescribed burning may pose several challenges to include 1) smoke in the city, 2) public use, and 3) establishment of firebreaks. These limitations can be easily overcome with a good burn plan and implementation. Use a qualified contractor or agency crew. It would be recommended the park be closed to the general public during prescribed burns until they are safely completed.



East prairie as seen from Memorial Park. The south forest is on the lower slope.



Thimbleweed, leadplant, and porcupine grass on the west prairie.



Rough blazing star blooming in east prairie during fall of 2013.



Thimbleweed, big bluestem, gray goldenrod, rough blazing star, false boneset, and others on east prairie.



Aspen invasion in west prairie.



Sumac invasion in east prairie.



Dense stand of sweet clover in the east prairie.



Silver buffaloberry in southeast corner of west prairie.

Oak savanna (6 A)



An oak savanna is a plant community where the tree density is low enough to allow sufficient sunlight to reach the ground to create a rich grass and forb ground layer. Tree canopy coverage ranges from 10 to 50%. Trees are described as open grown, with large lower limbs and a spreading, wide canopy.

The oak savanna is located along the very upper portion of the north slope along the ridge top, and also extends partially down the south slope, dividing the east and west prairies. The oak savanna consists of narrow band of trees on the east end, but broadens on the west. The soil type is Timula silt loam (TmC). Large, open grown bur oaks are the dominant tree species. A sufficient number of younger age bur oaks are present to replace the older bur oaks as they age and die. Although a number of native grass, sedge, and forb species are present, Canada goldenrod is the dominant ground species throughout much of the western portion of the oak savanna. Culvers root and columbine are found in the savanna. Cream gentian is found in one location on the savanna/prairie edge.

Growth of woody vegetation, both native and non-native, is the greatest threat to persistence of the oak savanna. Northern pin oak, aspen, basswood, white birch, and cottonwood have grown up within and along the edges of the oak savanna and add to the canopy cover. Sumac invasion is severe on the west end, and both aspen and sumac invasion is severe within the savanna area on the south slope. Low to

moderate buckthorn and honeysuckle invasion is present within the western portion. A few small, isolated patches of reed canary grass are also found within the western portion of the oak savanna.

Bird species that utilize oak savannas include red-headed woodpeckers, northern flickers, downy woodpeckers, hairy woodpeckers, and eastern bluebirds. Many of the same reptile and insect species found on bluff prairies also utilize oak savannas.

Management Goals:

- 1) Maintain savanna acreage by controlling and removing woody vegetation.
- 2) Increase native ground layer diversity.

Management Recommendations (See Appendix 2 for species specific control methods):

- 1) Remove invasive species: sumac, aspen, buckthorn, and honeysuckle. Follow-up treatment and monitoring will be required for several years.
- 2) Remove non-oak deciduous trees.
- 3) Remove northern pin oaks.
- 4) Control reed canary grass patches.
- 5) Use prescribed fire on a 3 to 5 year rotation to control woody and exotic species invasion and stimulate native ground flora diversity. Oak leaves under the Canada goldenrod stands should provide sufficient fuel to burn through these areas. Burn oak savanna in conjunction with prairies.

Limitations/hindrances to management: Prescribed burning may pose several challenges to include 1) smoke in the city, 2) public use, and 3) establishment of firebreaks. These limitations can be easily overcome with a good burn plan and implementation. Use a qualified contractor or agency crew. It would be recommended the park be closed to the general public during prescribed burns until they are safely completed.



Ground layer within the western portion of the oak savanna. Note buckthorn and sumac are also present.



Cream gentian located at edge of savanna and prairie.

Oak Grove (2 A)



The oak grove is located in the west-central portion of the south slope and divides the lower portions of the west and east prairies. The soil type is Timbula-Bold silt loams (ToD), and slopes are moderately steep to steep (12 to 60%). Large, open grown bur oaks are the dominant tree species, and this area was likely an oak savanna historically. Other tree species such as walnut and cottonwood now contribute to the canopy cover. Canopy cover is greatest on the east portion. The western portion of the oak grove is more open and a native savanna ground layer can still be found in some areas. Dense stands of sumac have become established at several locations throughout the oak grove and are spreading into the adjacent prairies. Buckthorn and honeysuckle are also present, but to a much lesser degree. The stairway connecting the south trail with the prairie trail is located within the eastern portion of the oak grove.

Management Goals:

- 1) Restore western portion of oak grove to oak savanna
- 2) Allow eastern portion of oak grove to succeed into deciduous forest.
- 3) Remove exotic and undesirable tree and shrub species from oak grove.
- 4) Increase native ground layer diversity.

Management Recommendations (See Appendix 2 for species specific control methods):

- 1) Remove invasive species: sumac, buckthorn, and honeysuckle. Follow-up treatment and monitoring will be required for several years.
- 2) Remove non-oak deciduous trees from western portion of oak grove.
- 3) Remove northern pin oaks from western portion of oak grove.
- 4) Use prescribed fire on a 3 to 5 year rotation to control woody and exotic species invasion and stimulate native ground flora diversity. Deciduous leaves should provide sufficient fuel to burn through this area. Burn oak grove in conjunction with prairies.

Limitations/hindrances to management: Although slope is steep, it should not impede management activities. Prescribed burning may pose several challenges as listed above for the prairies and oak savanna.



The oak grove separates the west and east prairies.



Large cottonwoods and sumac on the edge of oak grove.



View of the oak grove from the east prairie.



Stairs on the south trail run through the eastern portion of the oak grove.

South Prairie (7 A)



The south prairie is best described as former prairie and oak savanna due to the severe woody invasion that is occurring. Located on the western portion of the lower south slope, this area is the mostly heavily human altered portion of the bluff. Quarrying and material removal for Highway 61 and Eisenhower Bridge approach construction have resulted in bedrock exposure and nearly vertical rock faces in several areas. Many of these rock faces now have trees and shrubs growing on them. Bur oak, northern pin oak, walnut, box elder, elm, buckthorn, honeysuckle, and sumac are found throughout the area. Despite the woody invasion, most of the south prairie area still has a diverse native grass and forb ground layer. Big and little bluestem, porcupine grass, purple prairie clover, and leadplant are especially common. In addition to a few widely scattered mature bur oaks, bur oak seedlings and saplings are quite abundant throughout the area. The soil type is Marlean soils (MaF), a silt loam on very steep (40 to 80%) slopes.

Management Goals:

- 1) Restore area to prairie and oak savanna.
- 2) Maintain native prairie grass and forb species diversity.

Management Recommendations (See Appendix 2 for species specific control methods):

- 1) Remove sumac, buckthorn, and honeysuckle.
- 2) Remove non-oak deciduous trees.
- 3) Remove northern pin oaks.
- 4) Monitoring and follow-up treatment of woody species will be required for several years.
- 5) Use prescribed fire on a 3 to 5 year rotation to help control woody species invasion and remove excessive litter buildup. When possible, burn south prairie in conjunction with west prairie.

Limitations/hindrances to management: The several nearly vertical rock faces will provide challenges for management. Trees and shrubs growing on the upper portions of these faces will be very difficult to reach and cut. Judicious use of foliar application of herbicides may be justified on these sites. The rock faces will also serve as barriers to fire spread during prescribed burns. Crews should be able to navigate and light around these areas, but doing so will add time to completing burns.



Native prairie ground layer on south prairie.



Bur oak sapling on south prairie.



The west quarry is located in the south prairie.



Rock faces on south prairie.

South Forest (16 A)



The south forest is located along the east base of the south slope and extends around the east slope of Barn Bluff. It is best described as a maturing mixed species deciduous forest. The soil type is Terril Sandy loam (TeD), and was formed in loamy sediment. The historic native vegetation was tall prairie grasses. Slopes are moderately steep (2 to 25%).

Oaks are a significant portion of the canopy species, and many of the oaks are open grown with large spreading limbs suggesting a portion to majority of this area was once an oak savanna. Northern pin oaks, white oaks, bur oaks, and black walnut are dominant canopy species. Cottonwoods and white birch are present in some areas. Basswood, hackberry, and American elm are predominant in the sub-canopy, with severe invasion by buckthorn and honeysuckle in the understory. All ages of buckthorn and honeysuckle are present, and in some areas buckthorn seedlings have replaced the native ground flora.

As one moves up the south slope above the midland trail, the forest becomes very young. Except for a few large bur oaks, the area would better be classified as shrubland. Several red cedars are present, along with elm, buckthorn, honeysuckle, and other tree species. Height of woody vegetation is 6 to 10 feet, and a few small openings with native prairie vegetation are present in this area.

In addition to buckthorn and honeysuckle within the south forest, a small patch of creeping bellflower and a few oriental bittersweet vines are located along the south trail. These invasions are very localized

at this time. Scattered individual sweet clover plants are also located along the south trail. Garlic mustard was not observed in several site visits.

Several management options are available for the south forest:

- 1) Restore portion of the south forest north of the midland trail to prairie/oak savanna and allow portion of south forest south of midland trail to continue succession.
- 2) Allow all of south forest to continue succession.
- 3) Restore all of south forest to prairie/oak savanna.

As the portion of the south forest north of the midland trail is still early successional, restoration to prairie/oak savanna is still feasible. This area is approximately 2.2 acres in size.

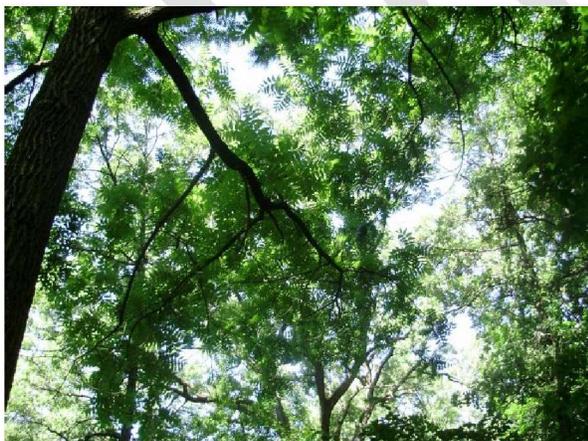
Management Goals:

- 1) Eliminate exotic invasive species.
- 2) Restore portion of the south forest north of the midland trail to prairie/oak savanna.
- 3) Allow portion of south forest south of midland trail to continue succession.
- 4) Increase native ground layer diversity.

Management Recommendations (See Appendix 2 for species specific control methods):

- 1) Remove exotic invasive species. As creeping bellflower and oriental bittersweet invasions are localized, these species should be controlled as soon as possible.
- 2) Control sweet clover along south trail, as seeds from these plants may be carried by hikers footwear onto the prairies.
- 3) Remove non-oak deciduous trees from north of midland trail.
- 4) Remove northern pin oaks from north of midland trail.
- 5) Follow-up monitoring and treatment of invasive species will be required for several years.
- 6) Use prescribed fire on a 5 to 20 year rotation to stimulate native ground flora diversity and help control woody and exotic species invasion. Deciduous leaves should provide sufficient fuel to burn through this area. South forest may be burned in conjunction with east prairie.

Limitations/hindrances to management: Although slope is steep, it should not impede management activities. Prescribed burning may pose several challenges as listed above for the prairies and oak savanna.



Black walnut in canopy of south forest.



White birch in south forest.



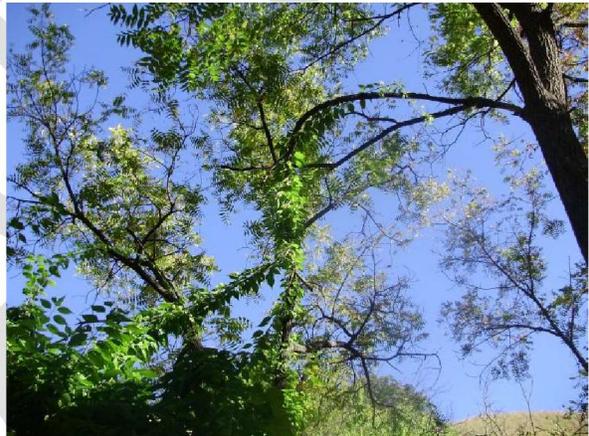
Native ground flora is still present in many portions of the south forest.



Severe buckthorn invasion along south trail.



Creeping bellflower is located along the south trail.



Oriental bittersweet climbing into a black walnut.



Upper portion of south forest (below rock face).



Upper portion of south forest looking upslope from midland trail.

North Forest (25 A)



The north forest is located on the north slope of Barn Bluff. Soil type is Frontenac silt loam (FrF), and slopes are very steep (40 to 80%). Current habitat type is deciduous hardwood forest, best classified as maturing/mature maple-basswood forest. Sugar maple, basswood, and hackberry are dominant in canopy and sub-canopy. Other tree species are also present including white birch. The shrub layer is largely absent. A healthy native forest ground layer is present and species include trillium, wild geranium, columbine, and maidenhair fern. No invasive species were located or identified during site visits.

Management Goals:

- 1) Maintain area as maple-basswood forest.
- 2) Prevent establishment of exotic species.

Management Recommendations (See Appendix 2 for species specific control methods):

- 1) Monitor yearly for invasive species.
- 2) Aggressively treat any invasive species locations when they appear.

Limitations/hindrances to management: Steepness of slope will limit management capability in some areas.

Summary/Other Considerations

Management actions can be summarized into two activities: 1) remove invasive species, some of which are native tree species that are not normally considered invasive species and 2) conduct prescribed burning. Initial costs in funding and time will be significant. Monitoring and follow-up treatment for invasive species will need to take place for several years following initial work. Eventually, it is hoped that prescribed burning will be the only management technique needed to maintain habitat types.

Woody invasives can be controlled in several ways. They can be cut using chainsaws and other tools, and stumps treated with a herbicide. Herbicides can be applied as a basal bark treatment or as a foliar application, although these methods may not be appropriate for most areas at Barn Bluff because of risk to non-target native plant species. Prescribed burning will kill seedlings and small saplings, and top kill larger individuals of some species. On most sites, cut trees and brush are piled and then burned. Unfortunately, the soil is usually sterilized at the burn pile site due to the intense heat, and it often takes several years before plants will grow. An alternative to piling and burning cut brush is to contact a biofuel company to determine the feasibility for them to pick up and haul away the cut brush. Movement of cut material to a convenient pickup site may prove difficult on this site, but this option should be explored further.

Some restoration sites are using goats in an effort to control invasive species. Repeated grazing within the same year and multiple years is necessary to achieve satisfactory control. Goat Peak Ranch, 29527 County 2 Blvd, Red Wing, MN 55066 (651/248-7443 or 651/368-2177) is a local source for goats for invasive species work.

Because annual funding is likely to be limited and the amount of work needing to be done will appear to be overwhelming, it would be best to choose priority habitat areas to begin work. The following areas are ranked from high priority to low priority:

- East and west prairies
- Oak savanna
- Oak grove
- South prairie
- South forest

Several funding and in-kind opportunities exist for management practices. These include: City of Red Wing funds, Friends of the Bluffs volunteer in-kind/funds, MN DNR in-kind for prescribed burning/funds, USFWS Partners for Fish and Wildlife Program in-kind/funds, and multiple grant opportunities (including National Fish and Wildlife Foundation-Pulling Together Grant). Local groups or clubs who use the trails regularly may also be willing to contribute volunteer time or funds for restoration work.

For each area several management recommendations are presented. As the property is a city park with heavy public use, public reaction should be considered before instituting any management actions as some of these actions may be controversial. Conducting good public outreach to explain management actions and goals will go a long way in preventing much of the controversy involved with management actions.

APPENDIX 1: Prairie and Savanna Plant Species List (partial)

June grass (<i>Koeleria macrantha</i>)	Porcupine grass (<i>Stipa spartea</i>)
Big bluestem (<i>Andropogon gerardii</i>)	Canada wild rye (<i>Elymus canadensis</i>)
Side-oats grama (<i>Bouteloua curtipendula</i>)	Little bluestem (<i>Schizachyrium scoparium</i>)
Indian Grass (<i>Sorghastrum nutans</i>)	Plains muhly (<i>Muhlenbergia cuspidata</i>)
Hairy grama (<i>Bouteloua hirsuta</i>)	Switch grass (<i>Panicum virgatum</i>)
Linear-leaved panic grass (<i>Panicum linearifolium</i>)	
Lead plant (<i>Amorpha canescens</i>)	Black-eyed susan (<i>Rudbeckia hirta</i>)
Purple prairie clover (<i>Dalea purpurea</i>)	Carolina larkspur (<i>Delphinium carolinarum</i>)
Hoary vervain (<i>Verbena stricta</i>)	Stiff Goldenrod (<i>Solidago rigida</i>)
Prairie rose (<i>Rosa arkansana</i>)	Evening primrose (<i>Oenothera biennis</i>)
Thimbleweed (<i>Anemone cylindrica</i>)	Ground plum (<i>Astragalus crassicaarpus</i>)
Pale spiked lobelia (<i>Lobelia spicata</i>)	Lance-leaf figwort (<i>Scrophularia lanceolata</i>)
False Gromwell (<i>Onosmodium molle</i>)	Prairie coreopsis (<i>Coreopsis palmata</i>)
Whorled Milkweed (<i>Asclepias verticillata</i>)	Common Milkweed (<i>Asclepias syriaca</i>)
Bergamot (<i>Monarda fistulosa</i>)	Daisy Fleabane (<i>Erigeron strigosus</i>)
Flowering spurge (<i>Euphorbia corollata</i>)	Painted leaf (<i>Euphorbia cyathophora</i>)
Missouri Goldenrod (<i>Solidago missouriensis</i>)	Harebells (<i>Campanula rotundifolia</i>)
Western ragweed (<i>Ambrosia psilostachya</i>)	Yellow coneflower (<i>Ratibida columnifera</i>)
Rough blazing star (<i>Liatris aspera</i>)	Dotted blazing star (<i>Liatris punctata</i>)
Pasqueflower (<i>Anemone patens</i>)	False boneset (<i>Kuhnia eupatorioides</i>)
Heath aster (<i>Aster ericoides</i>)	Sky blue aster (<i>Aster oolentangiensis</i>)
Aromatic aster (<i>Aster oblongifolius</i>)	Downy painted cup (<i>Castilleja sessiliflora</i>)
Clasping dogbane (<i>Apocynum sibiricum</i>)	Sage wormwood (<i>Artemisia frigida</i>)
Bastard toadflax (<i>Comandra umbellata</i>)	Smooth scouring rush (<i>Equisetum laevigatum</i>)
Stiff sunflower (<i>Helianthus pauciflorus</i>)	Woodland sunflower (<i>Helianthus strumosus</i>)
Ox-eye (<i>Heliopsis helianthoides</i>)	False dandelion (<i>Nothocallis cuspidata</i>)
Hoary puccoon (<i>Lithospermum canescens</i>)	Fringed puccoon (<i>Lithospermum incisum</i>)
Violet wood sorrel (<i>Oxalis violacea</i>)	Smooth cliff brake (<i>Pellaea glabella</i>)
Bladderpod (<i>Physaria ludoviciana</i>)	White snake root (<i>Ageratina altissima</i>)
Prairie ragwort (<i>Senecio plattensis</i>)	Grey goldenrod (<i>Solidago nemoralis</i>)
Upland white aster (<i>Solidago ptarmicoides</i>)	Blue-eyed grass (<i>Sisyrinchium capestre</i>)
Blue vervain (<i>Verbena hastata</i>)	Prairie bird-foot violet (<i>Viola pedatifida</i>)
Prairie willow (<i>Salix humilis</i>)	American bittersweet (<i>Celastrus scandens</i>)
Cream gentian (<i>Gentiana flavida</i>)	Culvers Root (<i>Veronicastrum virginicum</i>)
Red columbine (<i>Aquilegia canadensis</i>)	Canada Goldenrod (<i>Solidago canadensis</i>)
Northern bedstew (<i>Galium boreale</i>)	Elm leaved goldenrod (<i>Solidago ulmifolia</i>)
Yellow sweet clover (<i>Melilotus officinalis</i>)	White sweet clover (<i>Melilotus alba</i>)
Smooth brome (<i>Bromus inermis</i>)	Reed canary grass (<i>Phalaris arundinacea</i>)

APPENDIX 2: Species specific control methods

Aspen: Aspen can be controlled by cutting and applying herbicide to the cut stump(s). A 20% glyphosate (Roundup) solution should be applied to the cut stump with a low pressure hand-held sprayer or applied with a paint brush or wick applicator. A triclopyr herbicide (Garlon) may also be used for cut stump treatment. Aspens are notorious for root suckering, and will re-sprout from the root system if stumps are not treated.

Girdling can also be an effective method of controlling aspen. Removing a 6" or greater section of bark from the trunk in May or early June will eventually kill the tree and severely limit any root suckering. It often takes 2 to 3 years for trees to die, and the whole clone must be treated for girdling to be effective.

Sumac: To control sumac, stems should be cut in July or shortly after flowering. Stumps should be treated with a triclopyr (Garlon 4) or 20% glyphosate (Roundup) to minimize re-sprouting. Re-sprouts should be cut in August. Apply herbicide with a low pressure hand held sprayer, paintbrush, or wick applicator. Cutting and stump treatment are not as effective if conducted during the dormant season. If chemical treatment is not preferred, repeated cutting in July and then again in August for several years can be effective.

Basal bark treatment using Garlon 4 provides effective control of sumac. Foliar herbicide treatment using Garlon 3A or 1 to 2% Roundup can be effective as a control method. This method of control is not recommended on these sites because of the likelihood of overspray and drift injury to adjacent plants.

Prescribed burning in August will often kill mature plants if there is sufficient understory, but re-sprouting will occur.

Once sumac is controlled, an occasional August burn should be sufficient to prevent re-invasion of open areas.

Buckthorn: Buckthorn can be controlled by cutting and applying herbicide to the cut stump. Cutting and stump treatment are best done in the fall and winter, and should not be done in the spring when sap is rising. A 50% glyphosate (Roundup) solution can be applied to the cut stump with a low pressure hand-held sprayer or applied with a paint brush or wick applicator. Stumps that are not treated will re-sprout. Triclopyr (Garlon) herbicides or Trimec (a formulation of 2,4-D, MCCP, and Dicamba) may also be used for cut stump treatment. Treated sites should be monitored annually and follow-up cutting and stump treatment conducted as needed.

Seedlings and small saplings are easily hand-pulled, especially with moist soil conditions.

Dormant season basal bark herbicide treatment using Garlon 4 can also be used. Herbicide application should be to a height of 12 to 15" around the base of the woody stem. Avoid overspray and drift as Garlon 4 within the ground can still injure non-target plants.

Prescribed burning in late April to early May will kill seedlings and top-kill mature plants. Top-killed plants will re-sprout and repeated annual to biennial burns for 5 or more years will be necessary for effective control.

Honeysuckle: Bush honeysuckles are best controlled by cutting and applying herbicide to the cut stump(s). Cutting and stump treatment are best done in the fall and winter, and should not be done in the spring when sap is rising. A 20% glyphosate (Roundup) solution can be applied to the cut stump with a low pressure hand-held sprayer or applied with a paint brush or wick applicator. Stumps that are not treated will re-sprout. Other herbicides including 2,4-D, imazapyr (Stalker), picloram (Tordon), and triclopyr (Garlon) may be used for cut stump treatment, although some sources claim Garlon does not

provide effective control of bush honeysuckles. Treated sites should be monitored annually and follow-up cutting and stump treatment conducted as needed.

Basal bark herbicide treatment can also be used. Herbicide application should be at least 6" wide completely around the base of the woody stem. Do not use this method if there is heavy sap flow or snow is covering the application area. 2,4-D, imazapyr (Stalker), aminopyralid (Milestone), dicamba (Banvel), and triclopyr (Garlon) are effective herbicides for this treatment. Avoid overspray and drift to avoid killing other plants.

Foliar herbicide treatment is most effective as a control method when applied immediately after flower formation. Numerous herbicides are effective, but because of the likelihood of overspray and drift injury to adjacent plants this method of control is not recommended on these sites.

Prescribed burning in the spring will kill seedlings and top-kill mature plants. Top-killed plants will re-sprout and repeated annual to biennial burns for 5 or more years will be necessary for effective control

Sweet clover: Sweet clover is a biennial plant and may be controlled by several methods. For small infestations hand pulling is an effective method, but because of the long tap root is best done when there is good ground moisture. Pulling in the spring, before flowering is best. If mature flowers or seeds are present when pulled, then pulled plants should be bagged and removed off site for disposal.

Cutting or mowing close to the ground when the leaves on the lower stems have died and up to early stages of flowering before the seeds form can be an effective control method.

Prescribed burning can control sweet clover. An April burn is recommended the first year, followed up by a May burn the next year. If burning in May the second year cannot be done, then cut or mow close to the ground as above.

2,4-D can be applied to plants before the native prairie vegetation emerges in the spring. Timing is crucial, and because of possible injury to emerging native plants, this method is not recommended for this site.

Oriental Bittersweet: Oriental bittersweet is an exotic aggressively growing vine that grows around and over trees and other structures. Seedlings can be hand pulled. Cutting or mowing in the spring as close to root collar as possible will set back the plant. Repeated cutting every 2 weeks for an entire year may exhaust the root reserves. Prescribed burning in the spring may kill seedlings and young plants, but may promote spreading of established plants. The vines may act as a ladder fuel and carry fire into the crowns of trees, so caution should be applied when burning where bittersweet is present.

Treatment with glyphosate, imazapyr, and triclopyr herbicides is the most effective means of treating oriental bittersweet. Herbicides may be applied as a foliar spray, cut stump treatment, or basal bark treatment. Foliar or basal bark treatment is not recommended for this site due to likelihood of injury to native plants. Cut stump treatment would be the preferred method and can be used at any time of the year except when there is heavy sap flow or if snow covers the cut surface.

Reed canary grass: Prescribed burning can help control reed canary grass in those areas where fire adapted native species are present or in the seed bank. Repeated late autumn or late spring burning for a minimum of 5 to 6 years will be necessary. Fire is not effective in dense monocultures of reed canary grass where seeds or plants of native species are absent.

Glyphosate herbicides will control reed canary grass and should be applied to growing plants less than 6 inches tall. Application in early spring to young green plants and while native species are dormant is preferred. Mowing of mature stands and allowing regrowth before application is another method. Herbicide applications will likely need to be repeated in multiple years. As reed canary grass is

present as small monocultures within the oak savanna, judicious herbicide treatment on this site would be acceptable.

Creeping Bellflower: Creeping bellflower readily regenerates from perennial roots, spreads from rhizomes, and is tolerant of many broadleaf herbicides making it difficult to control. One of the best methods of control is to dig at least 6" deep and remove all rhizomes and perennial roots. If flowers are present, material should be bagged and disposed of in a landfill or burned.

Prescribed burning can kill germinating seedlings and suppress above-ground growth of established plants. Unfortunately, established plants will quickly re-sprout. Fire is not recommended as a control method unless used with other control methods.

Foliar applications of dicamba (Banvel), glyphosate (Roundup), or picloram (Tordon K) herbicides can control creeping bellflower. Herbicides should be applied during the flowering bud stage through the fall as long as leaves are green. Overspray and drift will kill non-target plant species.

Canada Goldenrod: Canada goldenrod has a fibrous root system and spreads by rhizomes, allowing it to form dense colonies. Small populations can be hand pulled when the soil is moist. Repeated pulling will be necessary as not all the roots will be removed,.

One of the more successful techniques for control of large colonies is carefully timed mowing early in the blooming period. Mowing for a minimum of 3 years and interseeding with other native species can eliminate a colony.

Foliar spraying with 2.5% glyphosate, 2% solution of Garlon 4, or a 3% solution of Garlon 3A can be used to control Canada Goldenrod. This method would not be recommended for this site due to likelihood of damage to desirable species.

Native deciduous trees: Deciduous trees are best controlled by cutting and applying herbicide to the cut stump(s) to prevent re-sprouting. A triclopyr herbicide (Garlon 4) is very effective for cut stump treatment. A 20% glyphosate (Roundup) solution can also be effective. Herbicides should be applied to the cut stump with a low pressure hand-held sprayer or with a paint brush or wick applicator.

Herbicide recommendations for cut stem treatment

Shrub	Herbicide
Japanese barberry	Glyphosate
Amur honeysuckle	Glyphosate
Morrow honeysuckle	Glyphosate
Tartarian honeysuckle	Glyphosate
Bells honeysuckle	Glyphosate
Common buckthorn	Triclopyr (Garlon 3A or 4)
Glossy buckthorn	Triclopyr (Garlon 3A or 4)
Multiflora rose	Triclopyr (Garlon 3A or 4)
Gray dogwood	Glyphosate
Red osier dogwood	Glyphosate
Smooth sumac	Garlon 4 as basal bark, either with or without previous cutting
Staghorn sumac	Garlon 4 as basal bark, either with or without previous cutting
Blackberries, raspberries, and dewberries	Triclopyr (Garlon 3A or 4)
Prickly ash	Triclopyr (Garlon 3A or 4)
Herbicides should be used at 20-30% active ingredient (the label will indicate the concentration of active ingredient in the product itself).	

