



**BARN BLUFF
LANDSCAPE GUIDELINES**

BARN BLUFF PARK, RED WING, MINNESOTA

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produced by **DF / DAMON FARBER**

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Barn Bluff Trail Map



REPORT RECOMMENDATIONS

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| A - North Trail Assist | E - Historic Concrete Repair | I - Potential Visitor Amenity Area |
| B - Proposed/Existing Trail Closure | F - Bank Erosion | |
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TRAIL LEGEND

- | | |
|------------------------------|-----------------|
| Proposed Trail Closure | — South Trail |
| Stairway | — Midland Trail |
| — Trail Realignment | — Prairie Trail |
| — Carlson Kiln Trail | — North Trail |

Barn Bluff Landscape Guidelines

INTRODUCTION

This Landscape Guideline was developed as a supplement to the Barn Bluff Cultural Landscape Report prepared by Two Pines Resource Group, LLC. The guideline is intended to assist the City of Red Wing manage and maintain Barn Bluff Park, a valued community cultural and environmental resource in the City of Red Wing. The Cultural Landscape Report includes recommendations for trail realignments, closures, and maintenance. This report provides specific information and guidance for addressing these issues.

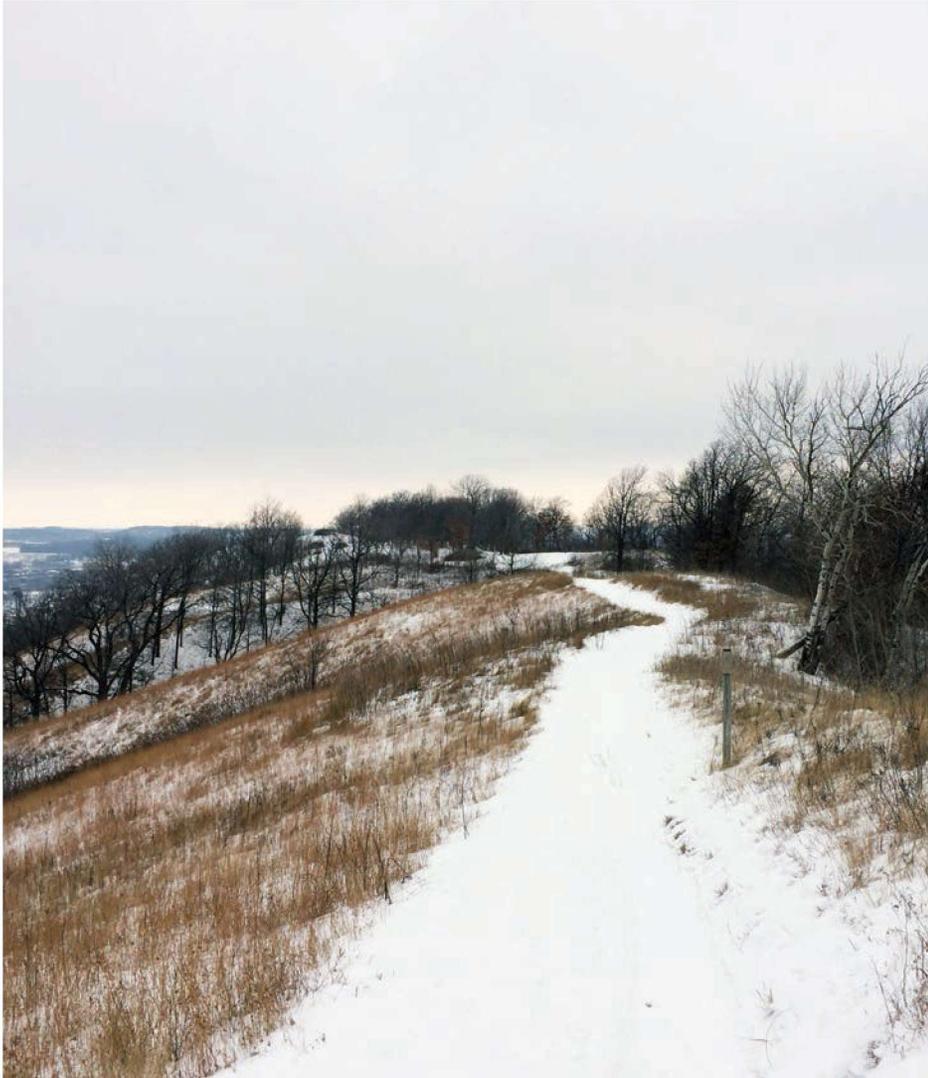
Because a portion of Barn Bluff Park is within the Barn Bluff National Register Historic District, care must be taken to use appropriate and compatible materials for maintenance of existing facilities and construction of new visitor amenities. Avoidance of construction materials which are not currently visible in the park is a basic guide. This document offers specific recommendations for materials to be used for new pathway, structure, signage and other construction within the park.

Finally, the guidelines within this document were developed during winter conditions. Snow prevented the authors from seeing much under the snow cover. With excellent institutional knowledge provided from our guide, and documentation found in the Cultural Landscape Study, this document was developed to cover the range of conditions both physically encountered and understood to be issues.



(Fig. 1.1) Historic Kiln Site

Construction Materials Guidelines



(Fig. 1.2) North Trail

CONSTRUCTION MATERIALS GUIDELINES

When constructing future visitor amenities in Barn Bluff Park, it is important to consider the specific intervention within the historic district. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* considers new additions under a Rehabilitation category, 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.” Specifically, item 9 of the chapter requires that: “New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property”.

Any new additions to the Park should be differentiated from the existing historic fabric but also compatible with the historic materials, features, size, scale, proportion, and massing to protect the integrity of the property and its environment. Taking these standards into consideration, reviewing historic photographs, and considering indigenous on-site materials; future interventions could include concrete, limestone, wood and steel. However, the design of these interventions should be differentiated, while still respecting the existing aesthetics of the park, and overall the designs should be compatible with the historic fabric.

Construction Materials Guidelines

The design of future interventions should be differentiated, while still respecting the historic fabric of the park.

SIGNAGE

- › Signs should be mounted on standard black painted, weathered steel or wood posts. Wood support structures should be treated with a natural color finish or allowed to weather.
- › Small scale directional map signage should use unobtrusive and durable materials such as aluminum plate or high pressure laminate and high density overlay plywood backing.
- › Larger scale interpretive signage should be vandal resistant high pressure laminate on a minimal steel or wood structure.
- › A clear, protective overlay sheeting to protect against graffiti should be considered.

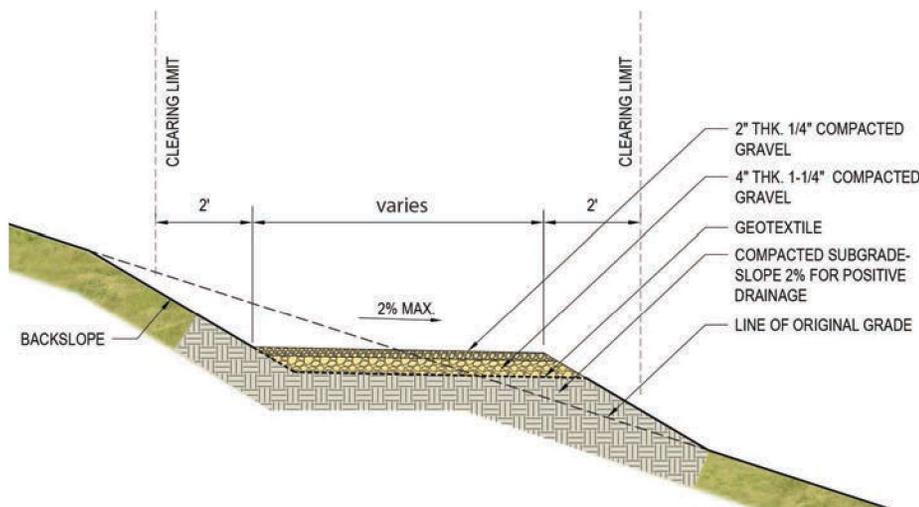
New structures should consider the rustic precedent of the former kiln sites, the forms of the precast concrete treads, the steel handrails, and former industrial design patterns.

STRUCTURES

- › Structures include decking, bridges, shelters, and other three dimensional constructions. In general, additional structures within the historic district boundary should be avoided.
- › If the addition of structures are necessary for the safety and access of the general public, compatible materials such as wood and regional limestone should be considered. Historic images of former kiln building sites indicate the use of wood, stone, and steel for structures.
- › New Construction in the park should consider the rustic precedent of the former kiln sites, the forms of the precast concrete treads, the steel handrails, and former industrial design patterns such as train tracks, mechanical equipment, quarry anchoring devices and fence sections when selecting or designing site furnishings.
- › As a non-contributing contemporary addition to the cultural landscape, structures should be designed with little color, or use earth tones, employ natural materials, and should not be located in areas where historic integrity would be negatively impacted.

TRAILS

- ▶ The majority of foot trails in Barn Bluff Park are narrow in width and constructed of compacted earth. This surface treatment maintains the historic integrity of the park and is appropriate where erosion and high foot traffic does not pose problems with the material.
- ▶ Where drainage and erosion is a problem, introducing reverse grade, wattles or other techniques described in this guide are appropriate solutions.
- ▶ If improved, engineered trail section materials are required, a native aggregate source crushed into irregular angular particles that will interlock and bind into a firm matrix is recommended. Due to the varying



(Fig. 1.3) Gravel Trail Construction

- conditions of the trail system, there may be some cases where Class V limestone may be required as a stable, durable solution over packed earth trails. Given the historic limestone quarry on site, it can be reasoned that this indigenous material was likely used as an inexpensive and readily available material for access routes.
- ▶ If a more engineered solution must be introduced such as a Class V aggregate (Fig. 1.3) to solve erosion problems or build up grade, care should be taken to select aggregate from the local area.
- ▶ When initially installed, Class V limestone may be bright and quite varied from the native soil. However it will eventually weather and be less obvious. A mix of native sand and Class V will lessen the visual impact. Maintaining the narrow character of the trail is important in trail improvement work.
- ▶ Slope considerations need to be carefully addressed throughout Barn Bluff Park. In general, the preferred slope for a trail is 7% (ADA requires 5%), with 10% as a maximum sustained slope, and 40% maximum for short distances. Slopes in excess of 40% should employ a switchback or riser system for safety and trail durability.

Construction Materials Guidelines

RAILINGS

- ▶ Several precedent images of functional steel and wooden railings can be found in photographs of the former kilns sites and historic stairways. One precedent is clear; the railings are safety interventions and do not have an intentional ornamental quality. However, the historic images of the Citizen's Memorial Stairway handrail appears to be welded with a continuous and smooth top rail. This aesthetic has a more finished quality to it than the contemporary pipe and connection galvanized railings installed at the west overlook and stairways.
- ▶ Future handrail installations should revert to a design which holds the handrail superior to the posts to form an uninterrupted horizontal rail, and use welded connections where feasible. It is recognized that the proximity of the railings creates access issues that may make welding difficult.

SITE FURNISHINGS

- ▶ Aside from historic treads re-purposed as benches, contemporary bench and kiosk installations at the East Kiwanis Stairway, and Limestone slab seating at the west overlook, few site furnishings exist in the park.
- ▶ Future site furnishings should consider the design and materials rustic precedent of the former kiln sites, the aesthetic quality of the precast concrete treads, the historic images of the steel handrails, and former industrial design patterns such as train tracks, mechanical equipment, quarry anchoring devices and fence sections.
- ▶ As a non-contributing contemporary addition to the cultural landscape, site furnishings should be minimally designed with little to no use of color, and should not be located in areas where historic integrity and views would be negatively impacted. Two sites are being considered by the City of Red Wing for additional amenities. Improvements to these areas

should be minimal, subdued, and not interrupt the historic qualities of the cultural landscape.



(Fig. 1.4) Overlook

Trail Maintenance Guidelines

A/F NORTH TRAIL

The North Trail begins at the east trailhead, climbs the East Kiwanis Stair and several switchbacks, and runs along the base of a former quarry. This area is popular with climbers and families and is a potential site for the introduction of seating or other minimal amenities. If seating is introduced to the area, a materials palette that includes wood, such as rough-hewn picnic tables, or benches constructed from wood (nominal lumber or local deadfall) and/or stone is recommended. Any amenities introduced into this area should be sited in a manner that does not impact existing views, landform or topography. Any additions within the cultural landscape should be ultimately considered as temporary structures, even though they may last for many years. As temporary installations, site structures will not permanently adversely affect the historic district.

The North Trail section continues west past the quarry area and continues as a packed earth trail benched into a consistently steep slope towards the west Kiwanis stairway. The trail width varies from 18"-3'. Occasionally, the trail intersects with a rock outcropping which is incorporated into the trail bed. Erosion along the north slope is evident and likely due to the heavy tree canopy and steep slopes which allows minimal water infiltration and sunlight. Ephemeral spring flora is abundant on the steep, dark forest floor, but minimal water infiltration and dry summer months result in erosion to the duff layer onto the trail in some areas.

Navigating the trail can be challenging in all seasons. Wet spring and icy winter conditions are slippery. Summer and fall conditions are less hazardous, but the narrow trail section perched on the steep hillside is difficult to negotiate. However, the trail is a contributing feature to the historic district, and minimal interventions should take place when safety improvements are being considered.

TRAIL IMPROVEMENT OPTIONS:

Several options have been considered for improving the condition of the western half of the North Trail.

Decking Structure

The first of these options is to construct a decking structure along the full length of the trail (Fig. 2.2)). A structure similar to this could run between \$500 and \$2,500 per lineal foot of structure, depending on the bluff attachment and structural requirements. Given the 1600 l.f. of trail along the north slope, this number is relatively high. In addition, a structure would adversely impact the historic district, would be highly disruptive to the existing slope during construction, and is not recommended.

Tread Wall

A second option for improving trail safety is to widen the tread through the use of a tread wall (Fig. 2.3 & 2.4). The tread wall would best be constructed of dry stacked regional limestone similar to examples seen near the kiln and accessory structures. The trail width could be more easily controlled as a level plane, and the width would provide security for users. A tread wall may be determined to be an adverse impact on the historic district, however, making it less than an ideal option.

Cable Rail

A third recommendation includes installing assistance mechanisms such as a cable rail. Considering the historic quality of the bluff, the cable rail is the preferred solution for mitigating the hazardous condition of the North Trail. The cable rail is a simple steel cable, anchored into the bluff slope, meant to provide assistance when needed (Fig. 2.6 & 2.7). The cable would be anchored only occasionally into the uphill bank of the trail with earth anchors and would not be consistent along the trail length. Special attention to the location of the cable rail would be given to portions of the trail that

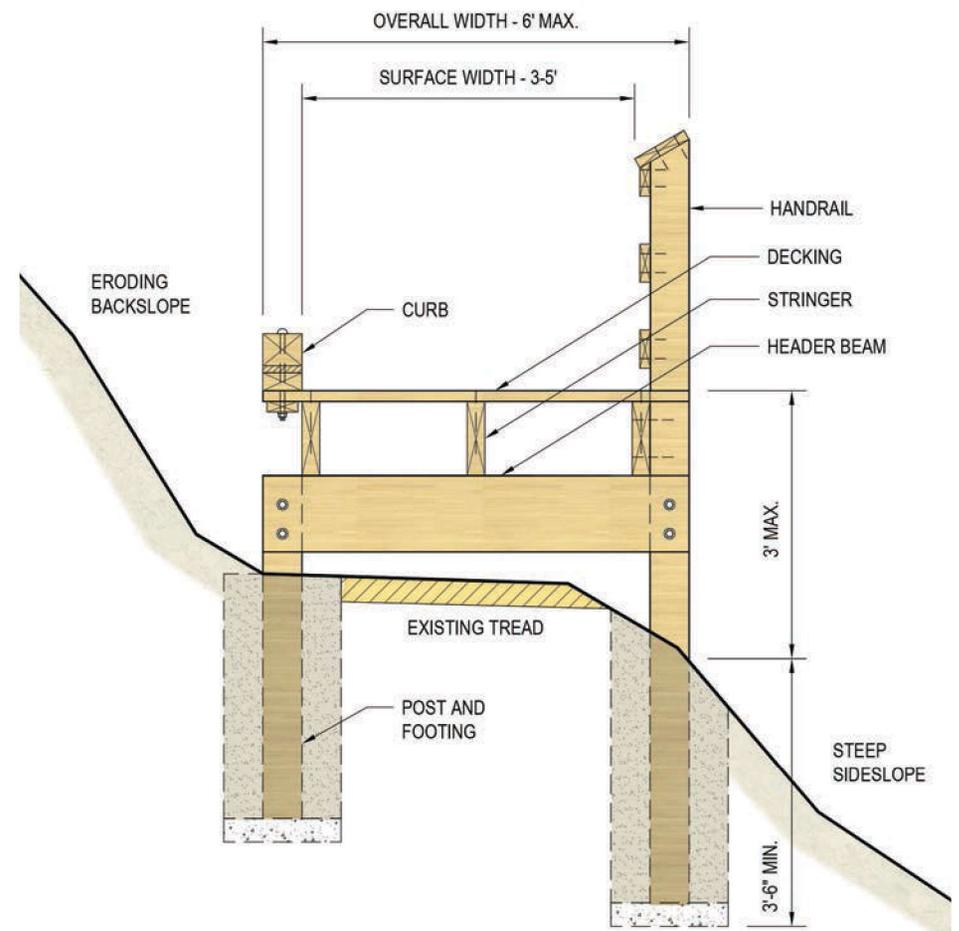
Trail Maintenance Guidelines

are considered the most hazardous. The cable rail is a minimally impactful solution for safety concerns along the trail. Handrails could be used as a safety intervention at the far western end of the north trail where the trail intersects with the historic steps and a somewhat precarious negotiation of the slope is required (Fig. 2.5).

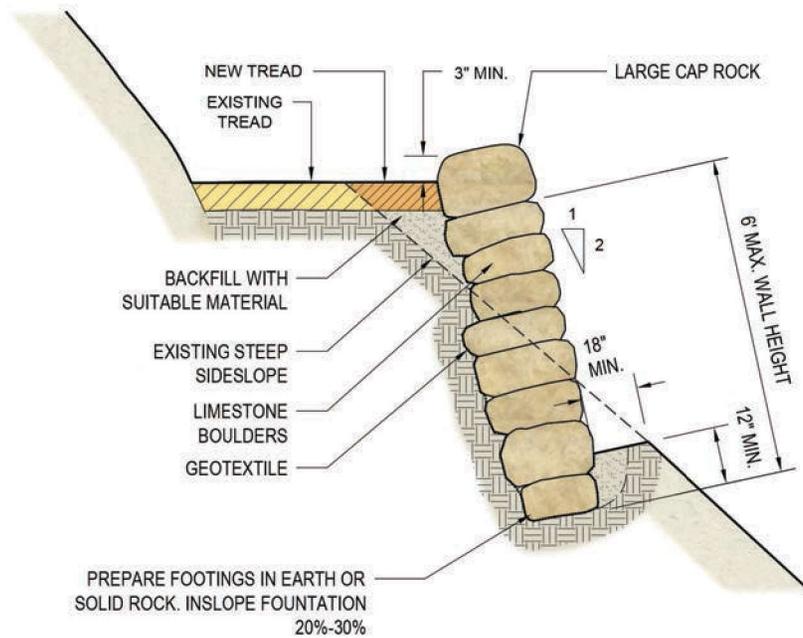
For additional suggestions on bank stabilization for the North Trail see section F: Bank Erosion.



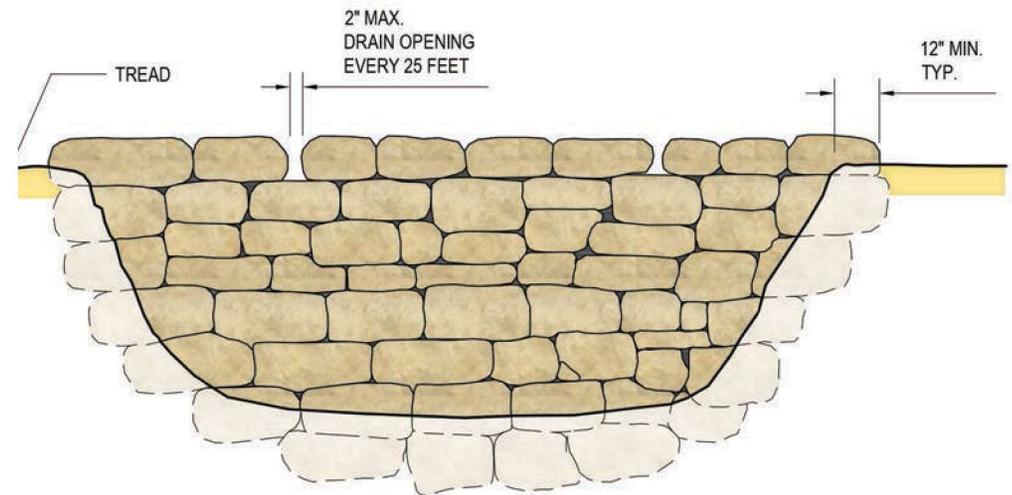
(Fig. 2.1) Existing North Trail condition



(Fig. 2.2) Bridge Structure over existing trail - Section



(Fig. 2.3) Limestone Tread Wall - Section



(Fig. 2.4) Limestone Tread Wall - Elevation

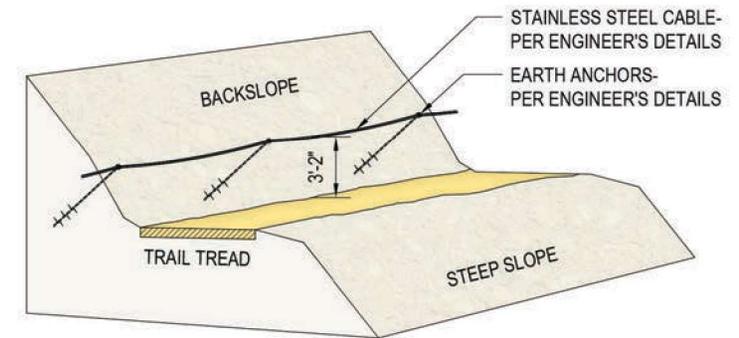
Trail Maintenance Guidelines



(Fig. 2.5a) Existing Cable Support seen at the Carlson Kiln site



(Fig. 2.5) North Trail and West Kiwanis Stairs



(Fig. 2.6) Cable assist with earth anchors



(Fig. 2.7) Example of cable assist steep slope

B TRAIL CLOSURES

In some areas of the park, volunteer trails have been established that are not suitable for use for a variety of reasons. In other locations, existing trails are not stable or lead through sensitive sites. Closing these trails can be a challenge and require months of follow up to ensure discontinued use.

Several methods for trail closure are appropriate for use in Barn Bluff Park. Figure 3.1 illustrates a situation where a renegade trail has been created by either human or animal use. The cable closure and signage is a good temporary installation, but further work is required to camouflage the existing volunteer route and thwart determined users. Over time, as the native vegetation is re-established and erosion minimized, the cable can be removed, drawing less attention to the area.



(Fig. 3.1) Existing trail closure

PROPOSED 5 STEP TRAIL CLOSURE PROCESS:

The site restoration should include the following steps to establish an effective permanent trail closure (Fig. 3.2-3.4):

Closure

- › Use signage in conjunction with cables or temporary fencing as required
- › Signage should notify users of the trail's closure, identify the reason for closure and can ask that users respect the area.
- › Remove the trail from maps, websites, brochures and signs

Re-Contouring and Stabilization

- › Scarify the soil to reestablish soil porosity. It is best not to turn soil over, but to work the soil leaving the surface layer in place. Use hand tools to scarify the soil surface such as a mattock or hoe.
- › Rake scarified soils from the side of the tread into the former tread to conceal depressions or evidence of volunteer trail.
- › Stabilize any erosion by using brush or earthen wattles, or erosion control logs

Camouflage

- › Screen the trail using sticks or logs, by either laying them across the path or placing them in a vertical stance (vertical deadfall)
- › Break up the line-of-sight to the former trail and guide users along the open trail by placing rocks or logs along the access point to naturalize the edge and block access (Fig. 3.2)

Trail Maintenance Guidelines

Re-Vegetation

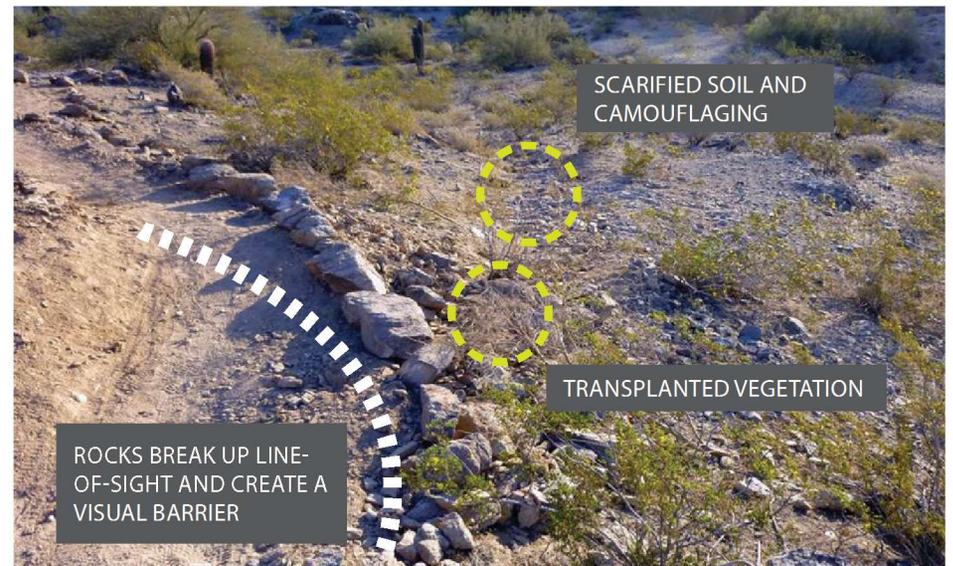
- ▶ Sow native seed into the newly scarified soil
- ▶ Plant the former trail with drought-tolerant, native species; consider transplanting shrubs and perennials from on-site
- ▶ Establish a vegetation barrier along the former access point to discourage entry
- ▶ Plant native, indigenous species that provide slope stabilization in steep areas
- ▶ Install erosion control blanket or mats as required in unstable conditions.
- ▶ Water new plantings during dry periods if possible

Monitoring and Maintenance

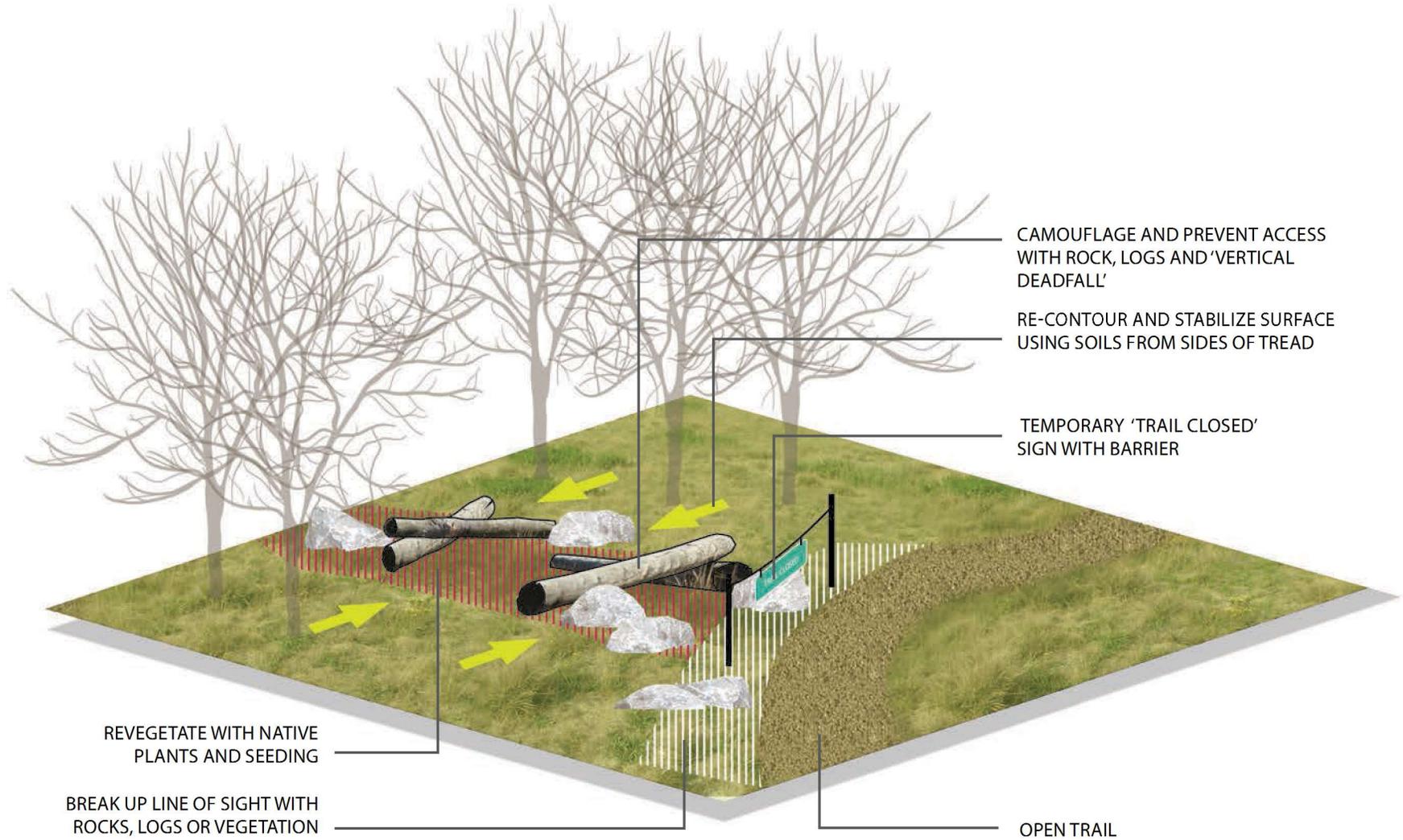
- ▶ Monitor installation over time to ensure that erosion is controlled little evidence remains of the old trail.



(Fig. 3.2) Successful camouflaging of existing trail, before and after



(Fig. 3.3) Camouflaging, re-contouring and re-vegetation of existing trail



(Fig. 3.4) Techniques for permanent trail closure

Trail Maintenance Guidelines

C TRAIL GULLY EROSION

The deep gully and erosion visible in this trail section (Fig. 4.1 and 4.2) is exacerbated by foot traffic, water and wind in this exposed bluff face.

SOLUTION:

Resolve erosion by providing landscape structure to navigate change in grade.

Techniques

- Plank Style Retaining Stairway (Fig. 4.2)
- Box steps (Fig. 4.3)

Either the construction of Box Steps or Plank Style Retaining Stairway will control this type of erosion. Other materials could be used, i.e.: limestone. However, consideration has been given for the location of this intervention. Moving heavy stone pieces to this location will be difficult. While stone would provide a more permanent solution, using treated wood planking may be implemented with less cost and more ease, and will provide decades of strength.

Restoration of the vegetation adjacent to the construction site should include appropriate regional native seeding, biodegradable erosion control blanket and compost log temporary erosion control.

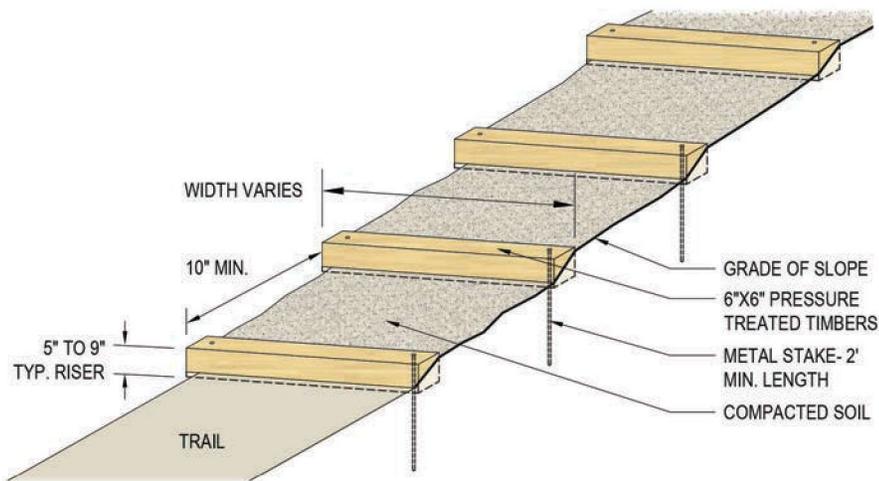


(Fig. 4.1) Erosion along Prairie Trail

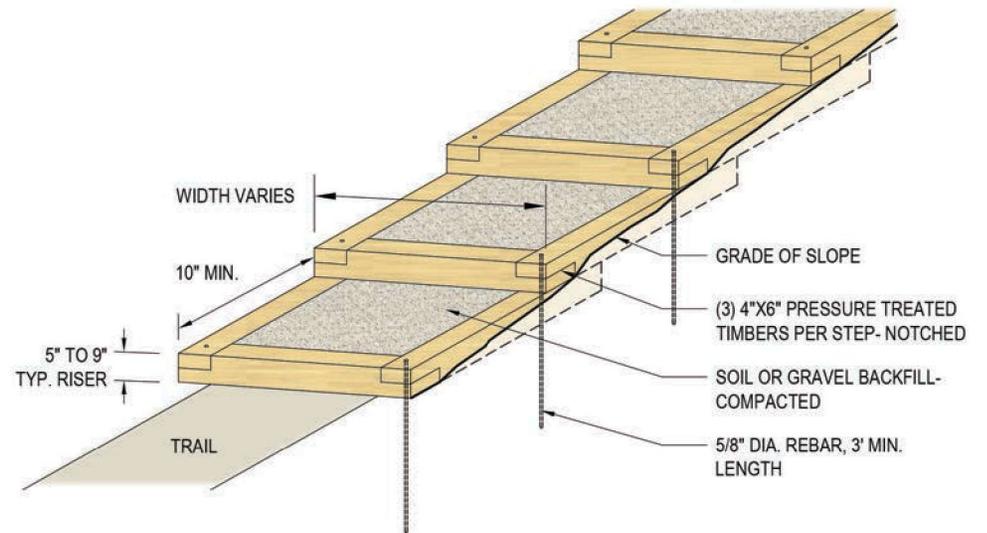


(Fig. 4.1a) Erosion along Prairie Trail

Construction of Box Steps or Plank Style Retaining Stairway would work well to control erosion along Prairie Trail.



(Fig. 4.2) Plank Style Retaining Stairway Construction



(Fig. 4.3) Box Steps Construction

Trail Maintenance Guidelines

D

REMOVAL OF CONSTRUCTION ACCESS

The former construction access at the west overlook is a wide, compacted class V limestone base on a steep slope. The access is wider than the standard trail system in Barn Bluff Park. The access is highly visible from downtown Red Wing, and has generated complaints from the public for aesthetic and safety reasons. (Fig. 5.1).



(Fig. 5.1) Existing construction access

SOLUTION:

Remove class V base and re-vegetate affected area. Optional additional interventions include the construction of water bars or box steps to navigate the slope. (Fig. 4.2 and 4.3) or revising the trail alignment to incorporate switchbacks. (see page 24)

Removal of the compacted class V will be labor intensive, but the excavated material can be used to fill in low spots or maintain packed earth trails in the vicinity. Once the unwanted material has been removed from the trail section, care must be taken to scarify the existing subgrade, then add the borrow, compacting while installing. The final elevation of the borrow material should be slightly raised above the adjacent grade to allow for further settling of the borrow soil. Erosion control fabric over regionally appropriate native seed should be installed with compost logs staked to impede water flow during establishment.

Due to the steep slope in this area, installing water bars, box steps or a switchback may be necessary (see fig 7.4, 4.3 and 8.1). These technical installations should be completed after removal of the existing class V surface. Once constructed, seeding with a regional seed mix covered with erosion control fabric and installing compost logs as temporary erosion control should complete the projects.



(Fig. 6.1) Existing concrete stairway

E HISTORIC CONCRETE REPAIR

Three concrete stair runs exist in Barn Bluff Park:

- Citizen's Memorial Stairway
- Central Kiwanis Stairway
- East Kiwanis Stairway

The Citizen's Memorial Stairway is in the most critical need of repair, although all three stairways require some maintenance. Examination of all three structures reveals exposed rebar, spalling concrete, cracking, and separation of structure elements (Fig. 6.1). Initial maintenance to minimize further structural damage to the structures should involve locating areas of water infiltration and patching these areas where feasible. In some cases, the repair will need to provide for anticipated thermal movement. A mock up treatment in an unobtrusive location should be prepared prior to any surface maintenance.

This work should be completed by a contractor with experience repairing historic concrete. In some cases, several attempts may be necessary to achieve compatibility between repair work and the original concrete texture and color. An extensive study and repair approach for all structures should be undertaken by a structural engineer with experience working with historic structures prior to any maintenance efforts.

Trail Maintenance Guidelines

F BANK EROSION

There are several instances in Barn Bluff Park where bank erosion adjacent to a trail cut is a problem. Evidence of this type of erosion can be found but is not limited to the following locations:

- The western portion of the South Trail
- The western portion of the north trail

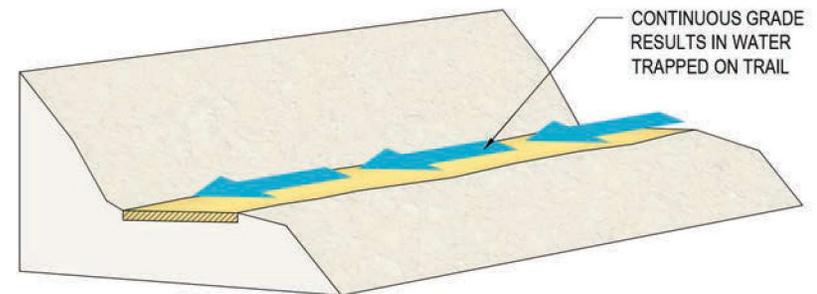
The key to controlling this type of erosion is establishing vegetation on the slope. This might be difficult, however, due to low soil moisture content and low light conditions, which tend to exacerbate the erosion problem. One option is to introduce a synthetic, permanent erosion control mat such as a geomat similar to MacMat produced by Maccaferri, Inc. Installation of the mat, along with topsoil, seed and a cover of a biodegradable erosion control blanket would give a seed mix a chance to grow and root into the slope. The permanent erosion control mat retains the soil on the slope even in extreme rain conditions.

A second option which may be useful for controlling the bank erosion in some areas is the use of live stakes. Live stakes are hardwood cuttings that are planted directly into the slope through a surface treated with biodegradable erosion control blanket. Live stakes are most feasible where the slope will be exposed to a minimum of 6 hours of sunlight. Spring installation is best practice for maximum survival rates where subsidized water is not available.

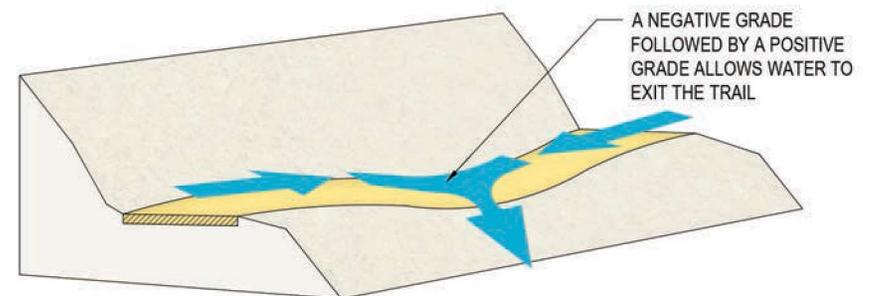
One last option for controlling bank erosion is to stabilize the slope with limestone cobble dry set walls. These walls can be seen in several places throughout the park as precedent and new construction should follow the existing patterns.



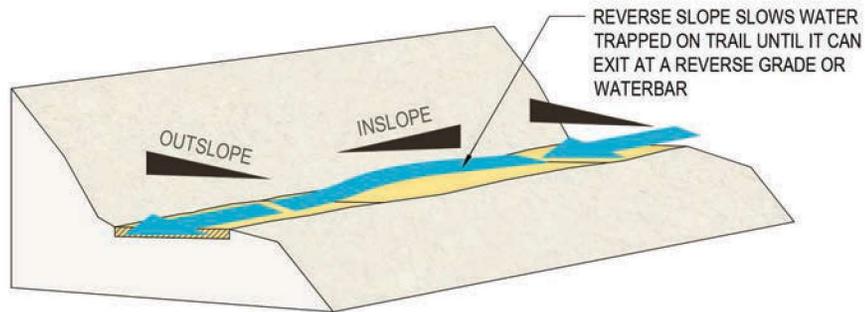
(Fig. 7.0) Continuous Grade



(Fig. 7.1) Continuous Grade



(Fig. 7.2) Reverse Grade

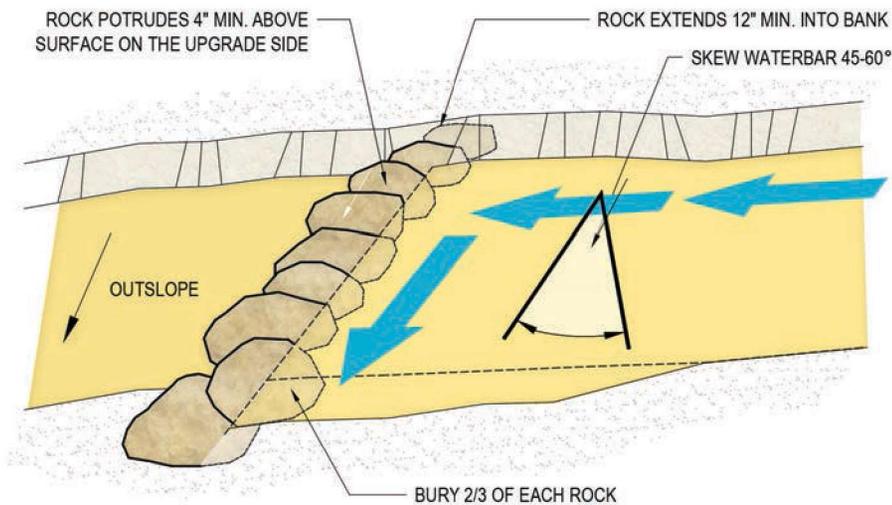


(Fig. 7.3) Reverse Slope

G GENERAL TRAIL WASHOUT

Trail washout exists in several areas of the park. Many of these incidents can be remedied by making slight modifications to the trail slope. Using the methods of reverse grade (Fig. 7.2) and reverse slope (Fig. 7.3), the grade of the trail can be modified so that washout does not run down the full run of the slope.

If the washout condition is too extreme, a combination of reverse grade, reverse slope and water bars should be implemented (Fig 7.4). These interventions can be installed slowly over time, and can be easily adjusted to moderate the erosion problems.



(Fig. 7.4) Waterbar Construction

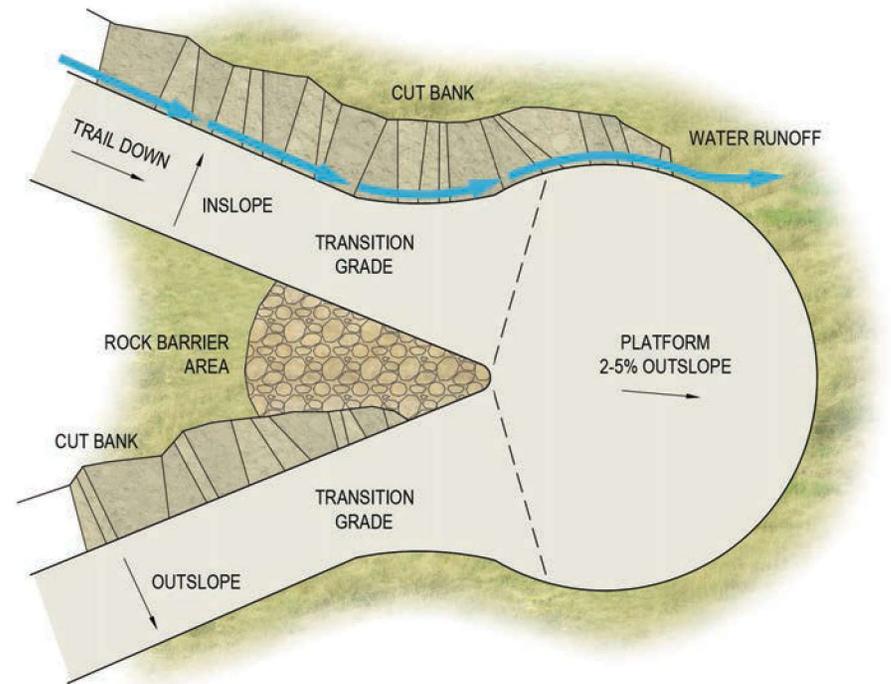
H PROPOSED SWITCHBACK

In some cases, building steps or other structures for navigating steep slopes are problematic or unnecessary. (see page 9/Trails for more information on appropriate trail slopes) Where sufficient space exists, a switchback is an appropriate solution (Fig. 8.1). A switchback can also direct access and manage viewsheds. Both important trail experience features should be considered when designing a switchback.

In Barn Bluff Park, one new switchback location has been identified based on the recommendations outlined in the Barn Bluff Cultural Landscape Report. The switchback trail will function to distract unnecessary foot traffic from an existing mound site, while providing a solution to the deep gully erosion that is occurring at the connection between the upper portion of the Central Kiwanis Stairway/seating area, and the Prairie Trail.

The siting of this switchback will need to be carefully staked in the field. Trail camouflage techniques may be required to discourage new trail cuts between legs of the switchbacks. Legs should be located far enough from each other that cut through traffic is discouraged. Reverse grading techniques should be employed to minimize the erosion potential for the new trail (Fig. 7.2). Temporary signage should be used to explain the trail realignment and erosion issues until the vegetation has been completely established in the former trail site and along the newly constructed switchback.

Another potential switchback location is at the west overlook access from the Prairie Trail. This switchback could help resolve the steep slope issues and also provide an alternate route to the Prairie Trail that does not disrupt the existing mound at the top of the hill.



(Fig. 8.1) Switchback Construction

The switchback will function to distract unnecessary foot traffic from an existing mound site, while providing a solution to the deep gully erosion.



(Fig. 8.2) Location of proposed switchback



(Fig. 8.3) Example of proper switchback trail construction

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