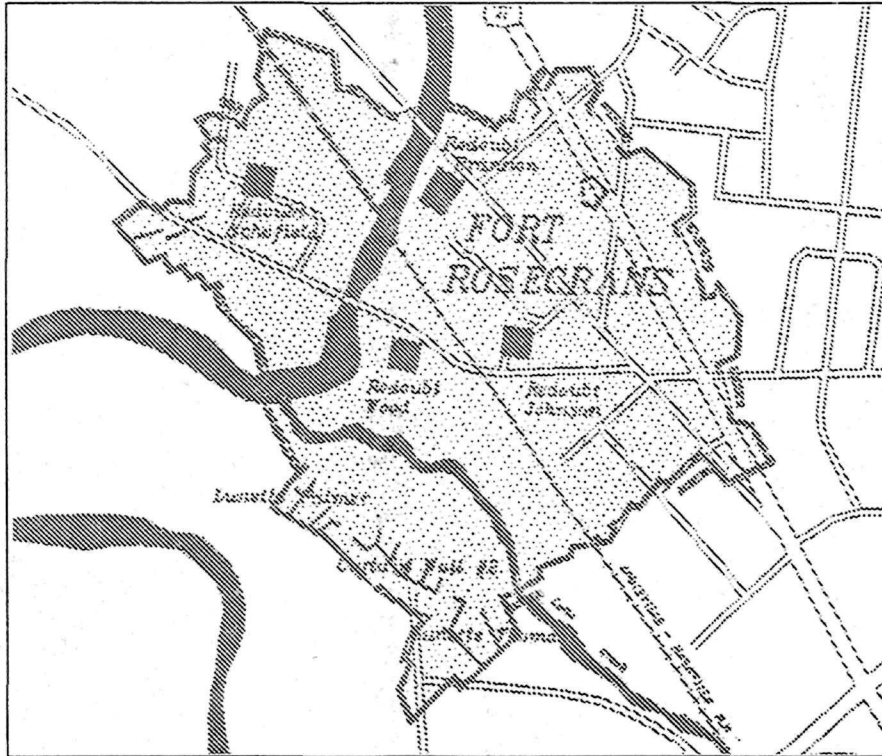


Preservation and Management Plan  
Environmental Assessment

REMNANTS  
OF  
FORTRESS ROSECRANS



LUNETTES PALMER AND THOMAS



STONES RIVER NATIONAL BATTLEFIELD

MURFREESBORO, TENNESSEE

PRESERVATION AND MANAGEMENT PLAN

ENVIRONMENTAL ASSESSMENT

REMNANTS OF FORTRESS ROSECRANS:

LUNETTES PALMER AND THOMAS

OLD FORT PARK

Murfreesboro, Tennessee

Prepared for

STONES RIVER NATIONAL BATTLEFIELD

by

Southeast Region, National Park Service,

United States Department of Interior

in cooperation with

City of Murfreesboro, Tennessee

December 1991

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MAPS AND ILLUSTRATIONS  
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## **EXECUTIVE SUMMARY**

### **PRESERVATION AND MAINTENANCE PLAN ENVIRONMENTAL ASSESSMENT**

#### **REMNANTS OF FORTRESS ROSECRANS**

This plan was developed in response to the 1987 legislation directing the Secretary of the Interior to "preserve the existing remnants of Fortress Rosecrans." The remaining earthworks, about 2500 linear feet of the original 14,600 linear feet, are located adjacent to the municipal golf course in Old Fort Park. The earthworks are well preserved under a forest cover.

Built between January and June 1863, the fortress served as a supply depot for the Union army advancing to Chattanooga. The more than 200-acre area enclosed by the earthworks included interior fortifications, a saw mill, warehouses, and ordnance depots. Most significantly, the fortress controlled the Nashville and Chattanooga Railroad and the Nashville Turnpike.

Today, all that remains of Fortress Rosecrans are Redoubt Brannan along Old Nashville Highway and the Fortress' southwest corner in Old Fort Park. This corner includes three architecturally and interpretively significant sections: Lunette Palmer, Curtain Wall #2 and Lunette Thomas.

A planning team composed of National Park Service staff and the Director of Parks and Recreation of Murfreesboro prepared four alternatives for the preservation and management of Fortress Rosecrans. Each alternative considers preservation of the earthworks and establishment of appropriate vegetative cover. Development includes parking, an interpretive trail with wayside exhibits and other visitor facilities. The plan also includes preservation, interpretation, and maintenance costs.

## ALTERNATIVE I - NO ACTION

A No Action alternative leaves the physical resource in its existing condition. Safety hazards, e.g., sinkholes, hazardous trees, etc., would be appropriately mitigated or eliminated. An orientation sign would be available at the existing parking area. The river trail would terminate at existing parking areas.

## ALTERNATIVE II - MINIMAL DEVELOPMENT

Under this alternative, a "light forest cover would be established at Lunette Palmer," while a native forest cover with some vista clearing would be restored along the curtain wall. Earthwork cuts from a road and archeological excavations would be filled in. A 20+ parking area with bike racks, benches, etc., would be constructed near the fort entrance. The river trail would link to this parking and orientation area. A boardwalk to the top of Lunette Palmer and a trail around the curtain wall would take visitors past 5 wayside exhibits interpreting the story of Fortress Rosecrans. Potential safety hazards would be treated the same as in Alternative I.

## ALTERNATIVE III - MODERATE DEVELOPMENT

Moderate Development expands on the features of Alternative II. It includes establishing a "tall grass cover" on Lunette Palmer. The tall grass cover includes a light tree canopy. A light forest cover would be established along the curtain wall. Lunette Thomas would be cleared of exotic plants, while the native forest would continue to provide visitors with a view of the face of the earthworks and the dry ditch. The boardwalk to Lunette Palmer would be expanded to include a loop trail, and under this plan, waysides would be increased to a total of eight.

## ALTERNATIVE IV - FULL DEVELOPMENT

A more intensely maintained vegetative cover and a loop trail into Lunette Thomas characterize additional developments in this Alternative. The full development alternative establishes a "turf cover" at Lunette Palmer, tall grass cover along the curtain wall and light forest in Lunette Thomas. The interpretive trail into Lunette Thomas would include three waysides. Audio stations would be added to the exhibit structures.

**PLAN FOR PRESERVATION AND MANAGEMENT  
OF  
FORTRESS ROSECRANS NEAR MURFREESBORO, TENNESSEE.**

**PURPOSE AND NEED FOR PLAN**

In December 1987 Public Law 100-205 required the Secretary of the Interior, among other actions, to "preserve the existing remnants of Fortress Rosecrans and the city [Murfreesboro] shall operate and maintain the fortress." Currently there is a bill before Congress to authorize the transfer of the remnants of Fortress Rosecrans from the city of Murfreesboro to the National Park Service, U.S. Department of the Interior. Whatever the outcome of this proposal, a plan for the preservation, interpretation, and maintenance of the remains of Fortress Rosecrans is needed.

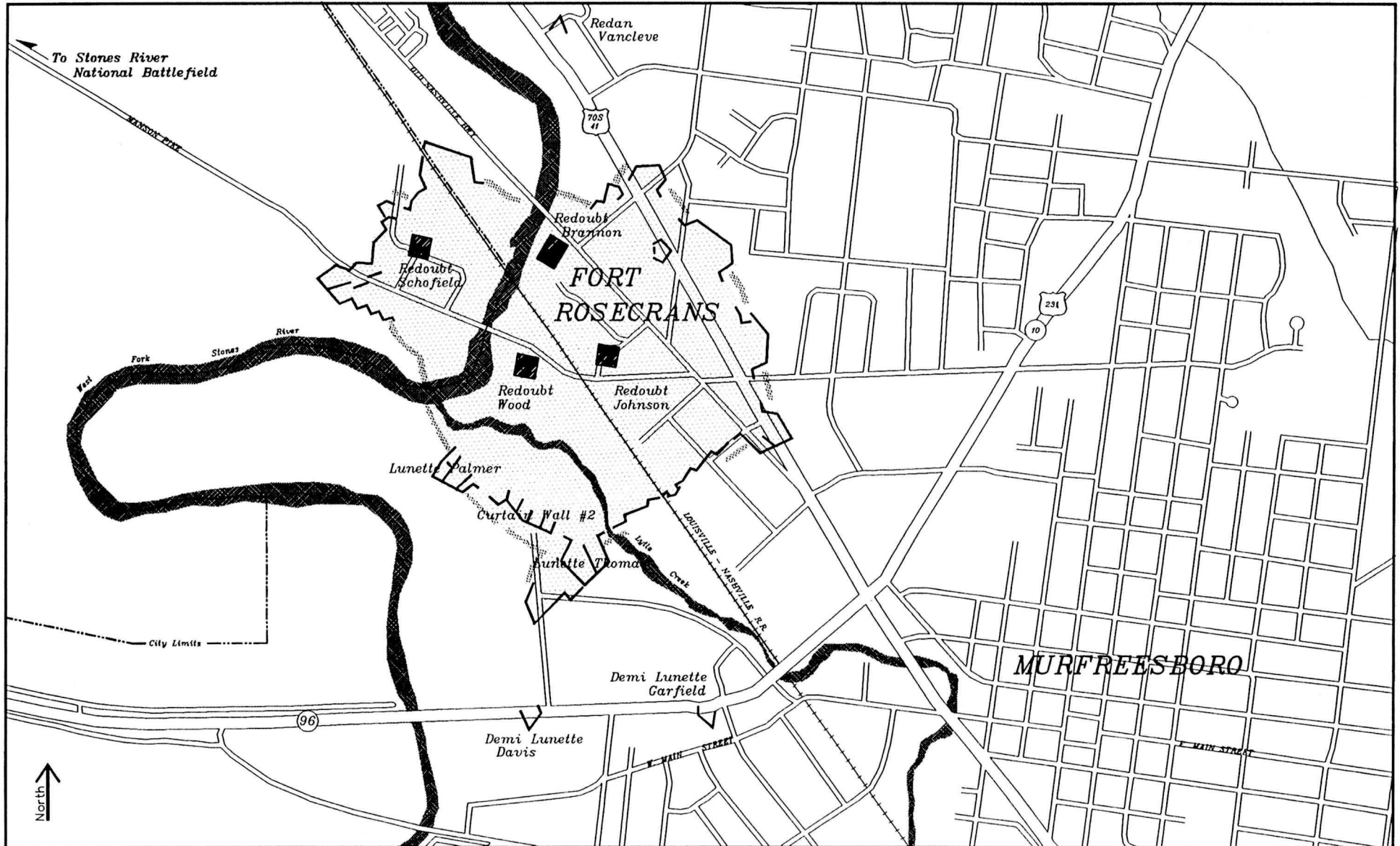
**EXISTING DOCUMENTATION**

Because Fortress Rosecrans was built in the five months after the Battle of Stones River and never was involved in any major action after its completion, it has not been documented in detail. National Park Service historian Edwin Bearss prepared a brief history of Fortress Rosecrans in 1960 based primarily on the Official Records of the War of the Rebellion. In 1989 NPS historian Len Brown expanded on Bearss' report using materials that had been published in the previous 30 years plus available regimental histories. Rosecrans was one of several Civil War fortifications discussed by David Wright in his thesis completed in 1981 at Middle Tennessee University. One archeological investigation occurred in the Fortress--Steven Fox using funds from the National Park Service, the Tennessee State Historical Commission and City of Murfreesboro investigated Lunette Palmer, one of three surviving features. His report was published in 1978. Finally in 1991 in preparation for the planning effort topographic maps covering the four sheets with a scale of 50 feet to the inch and 1 foot contours were completed by Francis-Steele Associates of Murfreesboro under contract to the National Park Service.

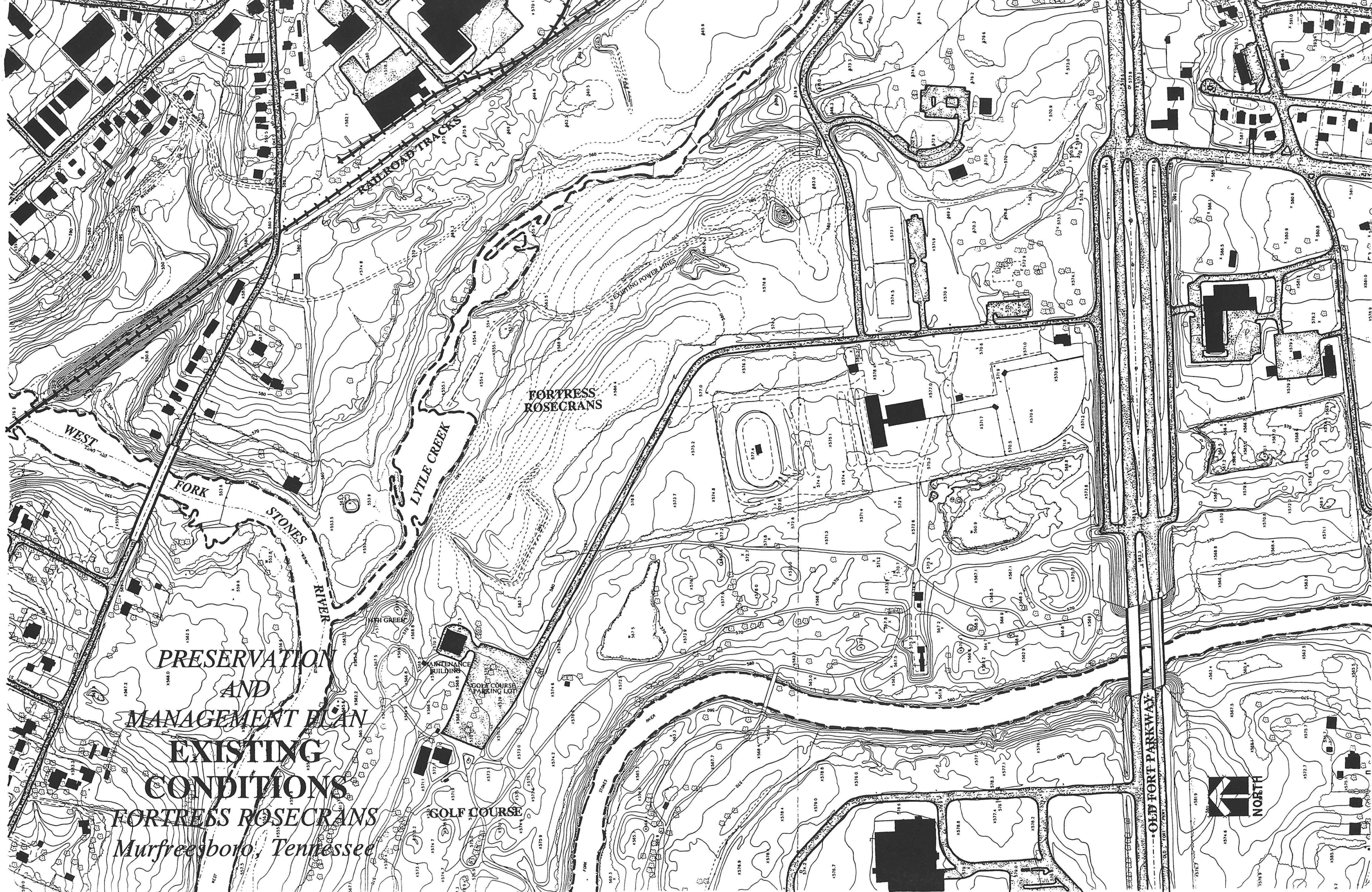
**BRIEF DESCRIPTION OF THE PROPERTY**

The remnants of Fortress Rosecrans are included within Old Fort Park which also includes a municipal golf course. Old Fort Park is the property of the city of Murfreesboro, Tennessee. Fortress Rosecrans was constructed between January and June 1863, and its 14,600 feet of earthworks enclosed over 200 acres. In the late 1980s all that remained were Lunettes Palmer and Thomas and Curtain # 2, the southwest corner of the original fortification--totaling about 2500 linear feet. This remnant is well preserved and covered with mature trees and understorey. It is listed on the National Register of Historic Places. See Vicinity Map and Existing Conditions Map.

# VICINITY MAP







**PRESERVATION  
AND  
MANAGEMENT PLAN  
EXISTING  
CONDITIONS  
FORTRESS ROSECRANS  
Murfreesboro, Tennessee**



## DESCRIPTION OF ALTERNATIVES

Four alternatives for Fortress Rosecrans were developed by the Planning Team. They include no action, minimal development, moderate, and full development. Each of the alternatives was divided into four elements: Preservation, Development, Interpretation, and Maintenance.

Preservation includes clean up of existing natural and manmade debris, preservation of the earthworks including stabilization and minimal restoration, obliteration of volunteer paths, and establishment of an appropriate vegetative cover.

Development includes providing access such as a parking area and linking of River and Rosecrans Trails, and development of support facilities including rest rooms, staging areas, rest areas, and drinking fountains.

Interpretation would include development of pedestrian access into and through the remains of Rosecrans, general orientation to the area, and other interpretive media. All proposed exhibits will be fiberglass embedded, four color panels. All audio messages will be on electronic chips operated by batteries contained within the exhibit housing.

Maintenance includes vegetative management after initial clearing and development of ground cover to maintain the established vegetative patterns. On going maintenance as well as cyclic maintenance of the facility and the interpretive media is included in this element. Estimates of staffing and costs in 1991 dollars for each activity have been made.

### **ALTERNATIVE I - NO ACTION**

Preservation would essentially leave the resource in its existing condition. There would be no removal of natural or manmade debris. Volunteer paths would be allowed to remain. No effort would be made to either preserve or restore deteriorated sections of the earthworks.

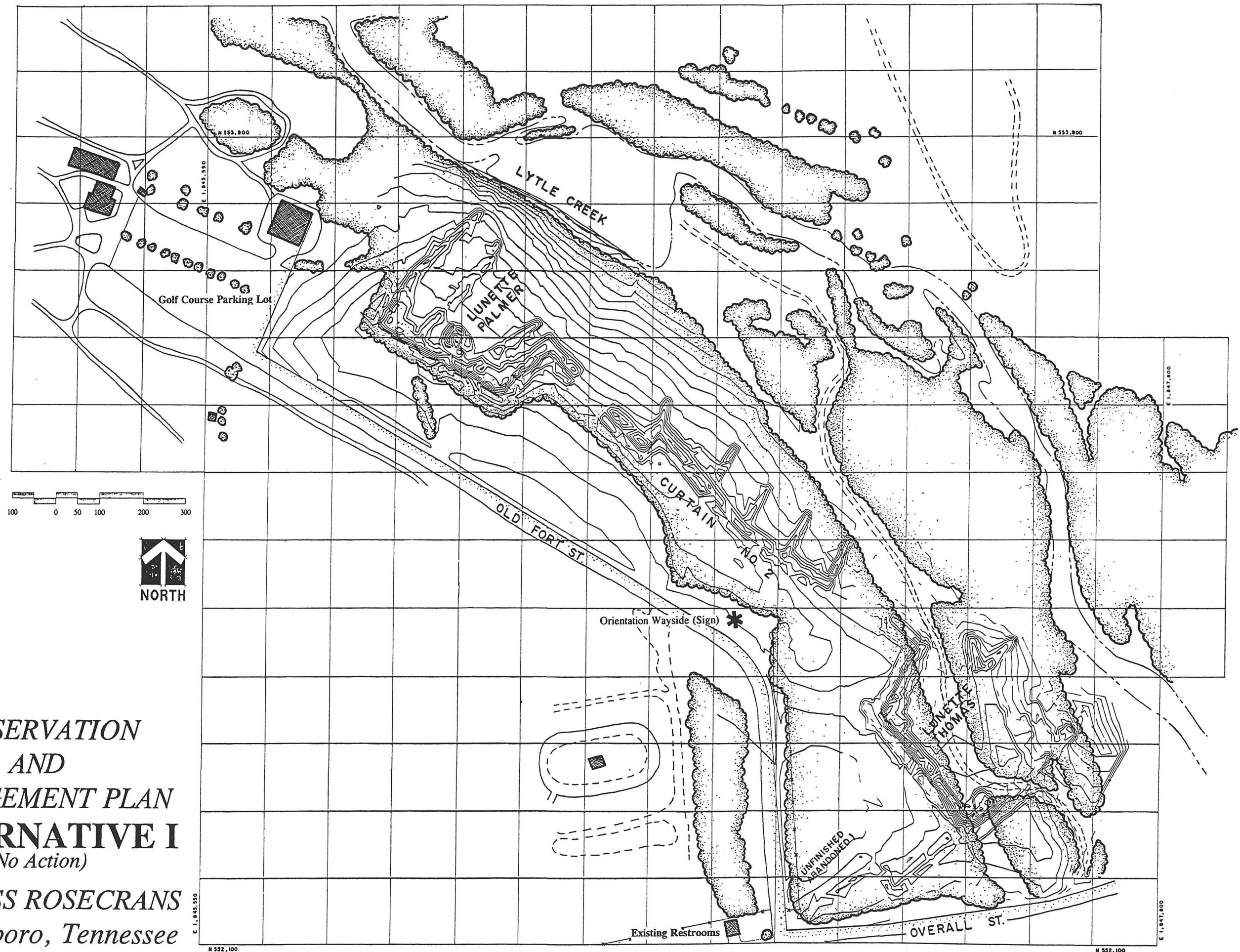
Development would be limited to safety concerns such as covering existing sinkholes with metal grates, erecting warning signs, and removal of potentially hazardous trees. A gate would be installed on the powerline road east of the fortification. Existing parking areas would remain, and the trail along Stones River would terminate either at the parking area for the golf course or the present pull off used by visitors to the fortification. The existing support facilities near the entrance to Old Fort Park including rest rooms and a water fountain belonging to the City of Murfreesboro or Rutherford County would be utilized (see Drawing for Alternative I).

Interpretation would continue to use the path along the crest of the earthworks with access at various points. The sign located at the south end of the structure near Lunette Thomas and the intersection of Old Fort and Overall Streets would be rehabilitated. The sign will be NPS standard single post and panel upright unit with a 36 X 54 inch panel (see Illustration A).



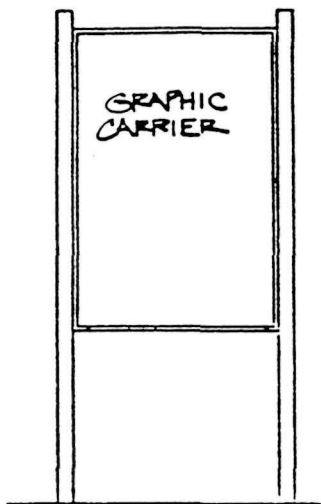
*PRESERVATION  
AND  
MANAGEMENT PLAN  
ALTERNATIVE I  
(No Action)*

*FORTRESS ROSECRANS  
Murfreesboro, Tennessee*

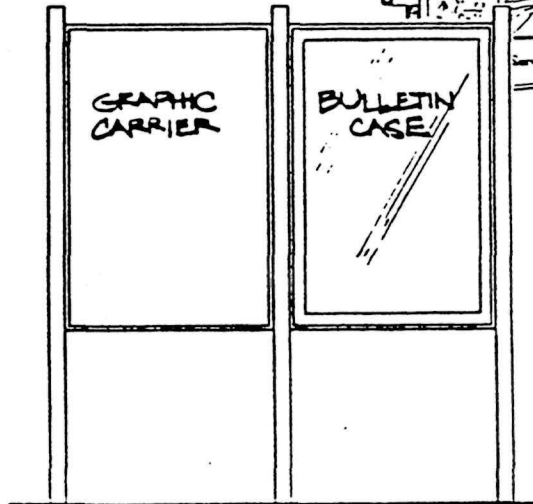


STANDARD NATIONAL PARK SERVICE  
WAYSIDE EXHIBIT BASE SYSTEM  
(UPRIGHT SERIES)

THIS SERIES OF BASES IS USED PRIMARILY  
FOR INFORMATION, ORIENTATION & SAFETY. ALSO  
TRAILHEAD EXHIBITS AND BULLETIN CASES.



SINGLE  
POST AND PANEL  
UPRIGHT UNIT



DOUBLE  
POST AND PANEL  
UPRIGHT UNIT



ILLUSTRATION A



The exhibit would provide information and orientation including a title, area designation, main text, and graphics. There would be no other interpretive media.

Maintenance would include periodic mowing of existing grassy areas, and trash pick up along entrance road and in parking area. Equipment will be brought from Stones River National Battlefield.

Estimated Full Time Equivalency (FTE) and estimated costs for annual operations under this alternative are as follows:

Maintenance - .25 FTE at a cost of \$7,500.

Protection and Interpretation - .25 FTE at a cost of \$7,400.

Costs are calculated at the 1992 salary rate for Wage Grade and General Service employees with Federal Employee Retirement System benefits calculated at 35%.

## **ALTERNATIVE II - MINIMAL DEVELOPMENT**

Preservation under this alternative would include the removal of all debris both natural and manmade from the site and the removal of potentially hazardous trees throughout the site. Vegetation management would consist of establishing a light forest cover at Lunette Palmer. Exotics would be removed along Curtain Wall 2. A native forest cover with some vista clearing for interpretation along the curtain wall would be established. The vistas would be cleared to match the light forest cover at Palmer. Forest cover would be established for a width of 15-20 feet along the east side of the interpretive trail. Native forest cover is a naturally established and managed to maintain a multi-aged, multi-layered structure. Light forest cover is naturally established native forest communities which have been selectively thinned or prescribed burned to provide greater visibility while retaining the natural canopy, understory, shrub and ground layers (see Illustrations B and C). Lunette Thomas would remain as it is with no effort to remove exotics growing there. The above descriptions are from Earthworks Landscape Management Manual, Park Historic Architecture Division, Office of Cultural Resources, N.P.S., USDI, Washington, D.C., 1989. The manual was prepared under contract to the NPS by Andropogon Associates Ltd. of Philadelphia, Pennsylvania. Cited hereafter as Earthworks Management Manual.

The existing archeological cuts or excavations and the field road that cuts through the south end of Curtain Wall 2 will be filled in and restored to existing contours. Rodent and erosion control of the earthworks would be undertaken as needed. The volunteer paths entering the earthworks at various points would be obliterated (**Appendix A contains a vegetation management and preservation plan for Fortress Rosecrans. This plan covers all four alternatives**). The power line road that passes along the east side of the site would be gated

and the width of the road reduced to limit unauthorized access into the interior of the fortification. If relocation of the power line and removal of some of the towers occur, the existing road will be relocated to the eastern edge of the site.

Development would include location of a paved parking area with a capacity for twenty cars and two buses (see Drawing for Alternative II). This lot would serve both visitors to the remains of Fortress Rosecrans as well as individuals using the River Trail that links Fortress Rosecrans and Stones River National Battlefield. Bike racks and benches would be located adjacent to the parking area along with an orientation wayside. The support facilities would be the same as for Alternative I. Actions to ensure visitor safety would be the same as Alternative I.

Interpretation would include a limited boardwalk to the top of Lunette Palmer and returning to grade at the point the interpretive trail begins (see Drawing, Alternative II). It will meet accessibility standards. The interpretive trail would continue down the interior wall of Curtain 2, exit at the southern end of the curtain wall, and return along the face of the fortifications to the parking lot. There would be five waysides including the orientation wayside at the parking lot (see Design Concepts for Boardwalk and Waysides Along Boardwalk at end of this section).

Orientation Wayside - This wayside would orient the visitor to the opportunities for use of the River Trail and the presence of Fortress Rosecrans. Exhibit will be NPS standard double post and panel upright unit with two 36 X 54 inch panels (see Illustration A). Exhibit would include a title, area designation, main text, graphics, and captions.

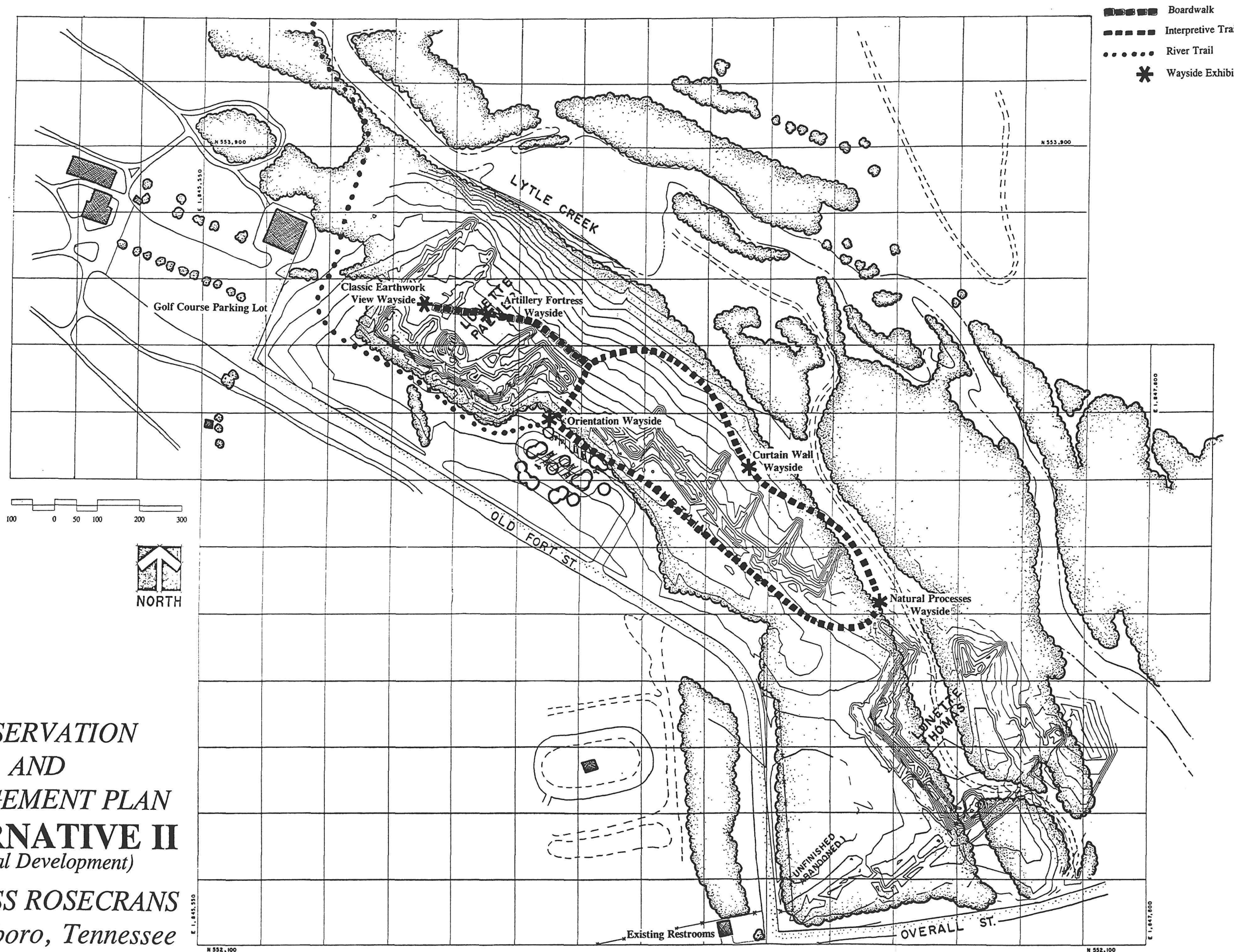
Classic Earthwork View - Exhibit would describe the view from the top of the boardwalk in Lunette Palmer. It will be NPS standard low profile surface mounted unit with one 42 X 20 inch panel (see Illustration D). Exhibit will include a title, illustration (line drawing or photo overlay) detailing significant points of interest visible from the site, primary text, secondary graphics, secondary text, and identification labels.

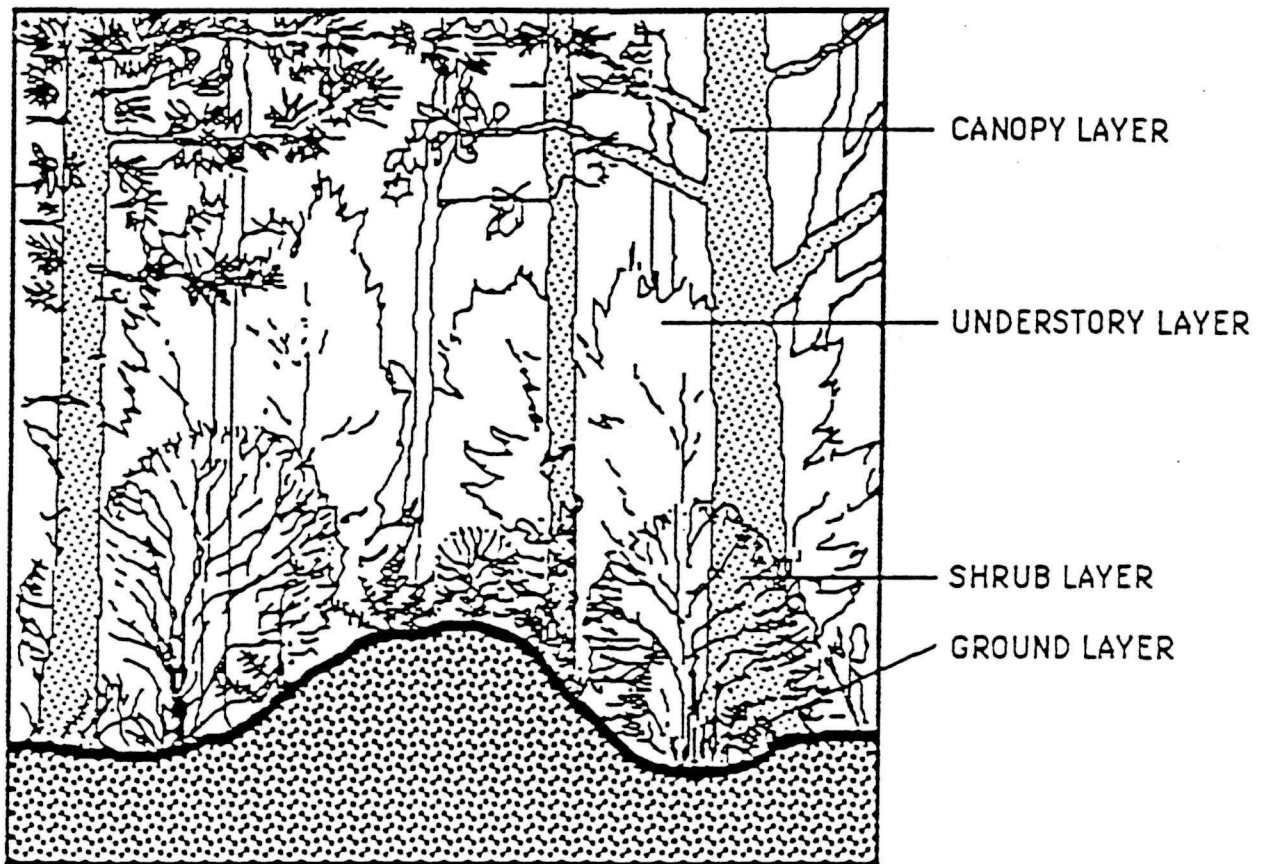
Artillery for Fortress - This wayside will describe the function of a lunette and the artillery located there. Exhibit will be a standard NPS low profile surface mounted unit with one 36 X 24 inch panel. Exhibit will include a title, illustrations, primary text, and identification labels.

Curtain Wall - Exhibit will describe traverses and firing steps used by the infantry and function of a curtain wall. The exhibit will be a standard NPS low profile in-ground unit with one 36 X 24 inch panel (see Illustration D). Exhibit will include a title, illustrations, primary text, and identification labels.

Natural Processes at Lunette Thomas - Wayside will explain why Lunette Thomas is being left in its natural state, while describing how natural processes worked to preserve the earthwork.

*PRESERVATION  
AND  
MANAGEMENT PLAN  
**ALTERNATIVE II**  
(Minimal Development)  
FORTRESS ROSECRANS  
Murfreesboro, Tennessee*



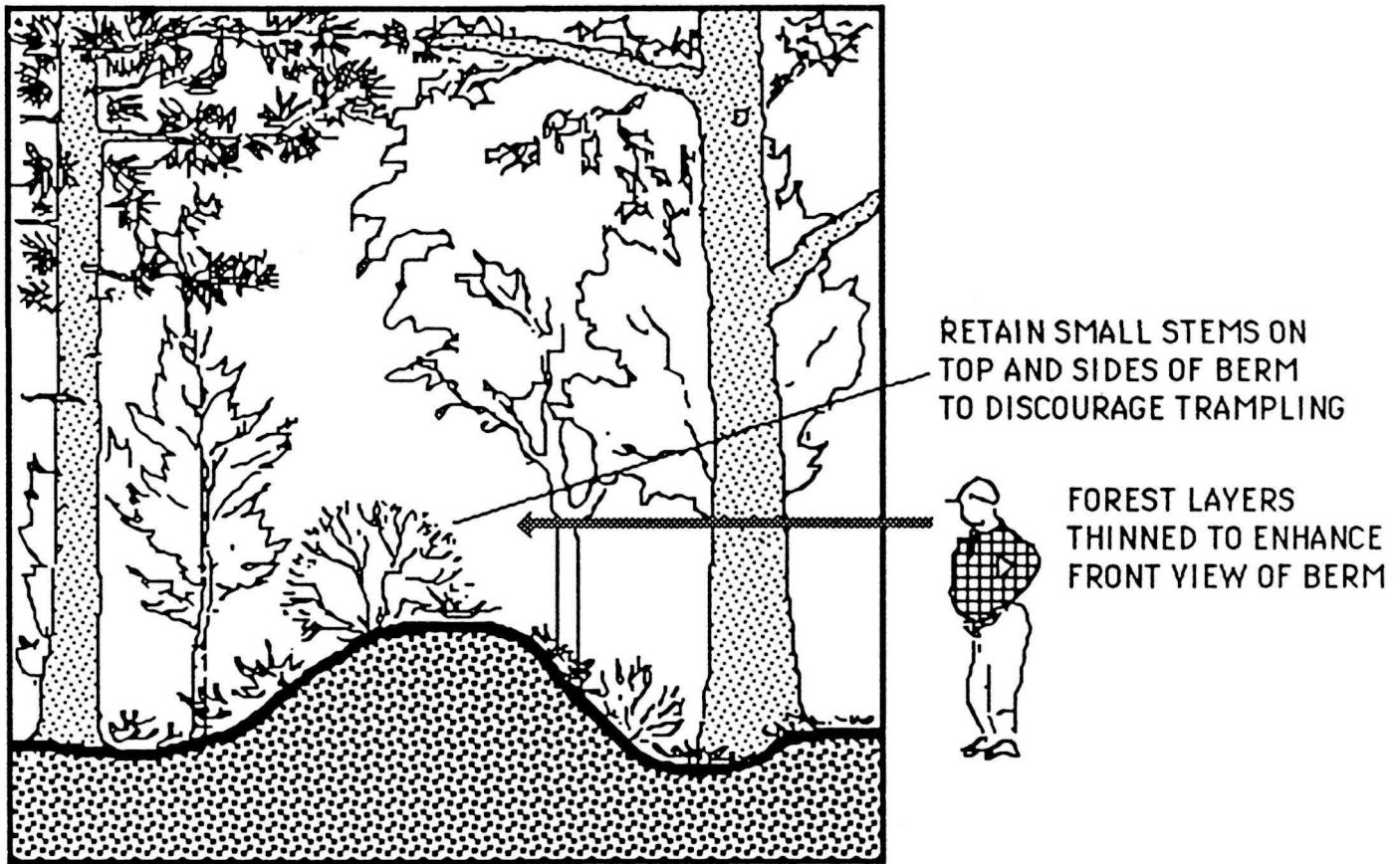


### **Recommended Forest Cover Types: Forest**

Dense native forest managed to maintain multi-aged, multi-layered structure. Monitor for hazards, such as windthrows, animal burrows, and relic hunter's holes.

## **ILLUSTRATION B**





### **Recommended Forest Cover Types: Light Forest**

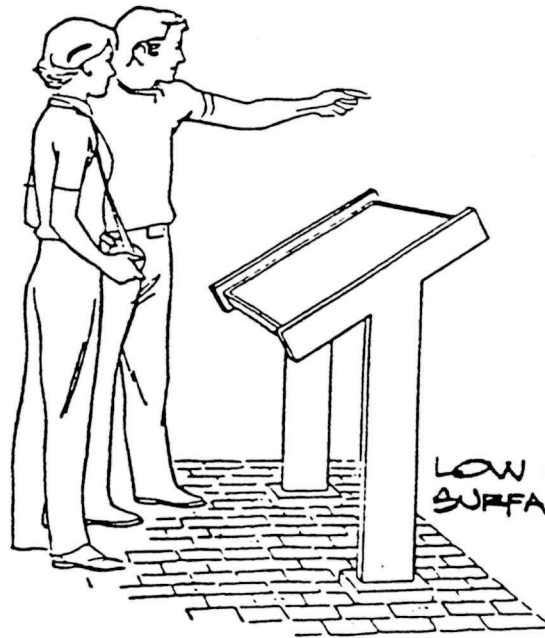
Native forest selectively thinned in the shrub and understory layers to allow adequate visibility while retaining overall layered structure. Only a small amount of thinning should be done each year.

## **ILLUSTRATION C**

STANDARD NATIONAL PARK SERVICE  
WAYSIDE EXHIBIT BASE SYSTEM  
(LOW PROFILE SERIES)

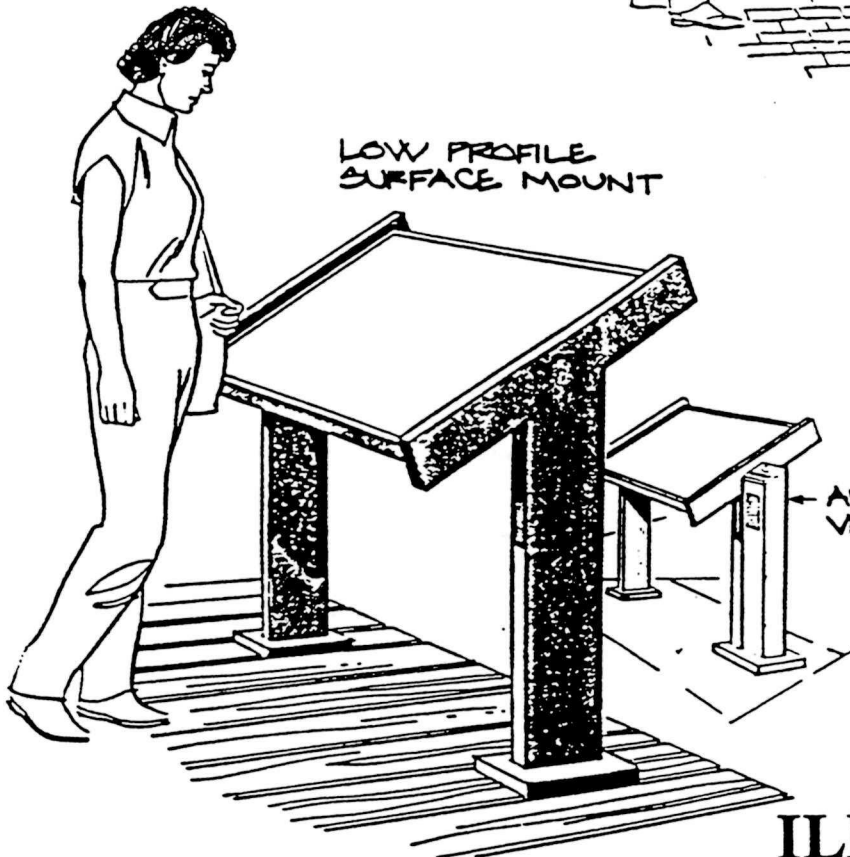
THIS SERIES OF BASES IS USED PRIMARILY  
FOR SITE-SPECIFIC INTERPRETIVE EXHIBITS

LOW PROFILE  
IN-GROUND  
UNIT



LOW PROFILE  
SURFACE MOUNT

LOW PROFILE  
SURFACE MOUNT



AUDIO  
VERSION

ILLUSTRATION D

Exhibit will be a standard NPS low profile in ground unit with one 36 X 24 inch panel. Exhibit will include a title, illustration detailing historic appearance (Civil War era photo if possible), and text.

Publication - A unigrid brochure in Harpers Ferry Center Design Format B4 (eight panels per side) will use one side for a small scale map of Stones River NB and Fort Rosecrans and the other side for text and small illustrations. This publication will serve as the "park brochure" for Stones River National Battlefield, it would add a brief history of Fortress Rosecrans to the narrative of the Battle of Stones River.

Maintenance would include periodic clearing of the interior of Lunette Palmer to maintain the Light Forest Cover as well as clearing of interpretive vistas along the trail down Curtain Wall 2. Trees in front of the overlook at the top of the boardwalk at Palmer would be trimmed to maintain an open view. Maintenance of the parking area, boardwalk, interpretive trail and interpretive media would be required. Tools and equipment would be transported from Stones River National Battlefield.

Estimated Full Time Equivalency (FTE) and costs for annual operation under this alternative are as follows:

Maintenance - 1 FTE at a cost of \$29,400.

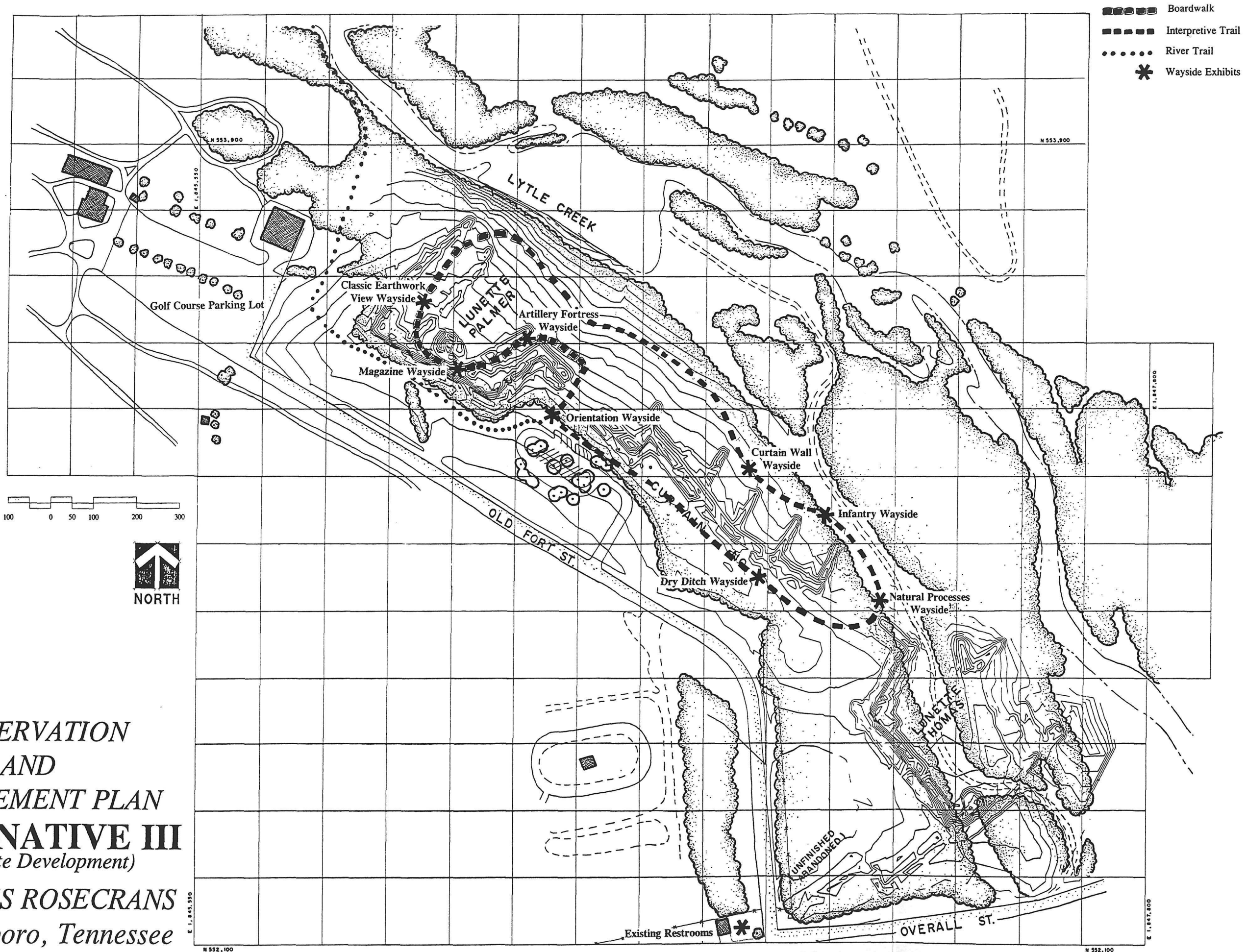
Protection and Interpretation - .75 of a FTE at a cost of \$22,200.

Calculation of personnel costs based on same formula as in Alternative I.

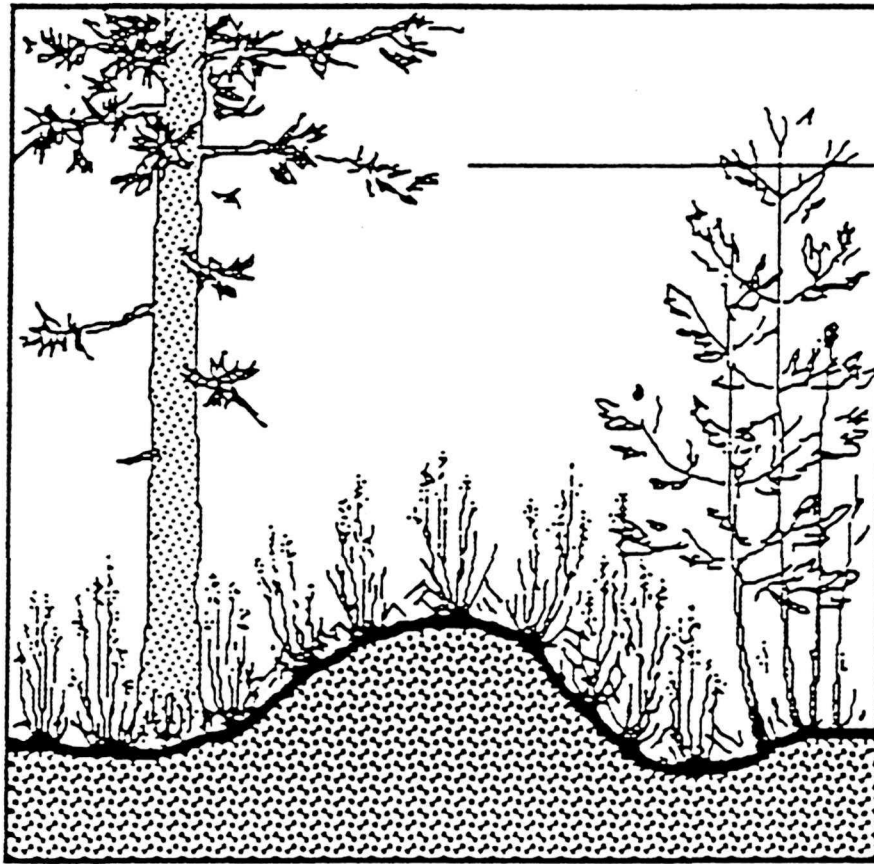
### **ALTERNATIVE III - MODERATE DEVELOPMENT**

Preservation. The removal of natural and manmade debris and potentially hazardous trees would be the same as Alternative II. Vegetation management would consist of establishing a tall grass cover within and on the earthworks at Lunette Palmer. Tall grass cover is made up of native grasses, some naturalized alien grasses, and wild flowers that exist under a light tree canopy (see Illustration E--drawing from Earthworks Management Manual). The interior of the fort along the Curtain Wall would have a light forest cover. A native forest cover would be established along the east side of the interpretive trail as described in Alternative II. Within Lunette Thomas there would be an eradication of exotics, however, the native trees, understory, and ground cover would remain in a natural state. The ditch, consisting of the scarp and counterscarp and the front wall of the earthworks, would have a light forest cover along the trail returning to the parking area. This would provide visitors with a view of the face of the earthworks and the dry ditch (see Appendix A).

*PRESERVATION  
AND  
MANAGEMENT PLAN  
ALTERNATIVE III  
(Moderate Development)  
FORTRESS ROSECRANS  
Murfreesboro, Tennessee*







CANOPY SHOULD BE  
REPLACED AS TREES ARE  
LOST. NEW PLANTING  
SHOULD NOT BE ON BERM  
OR IN TRENCH

### **Recommended Field Cover Types: Tall Grass**

Dense stands of native grasses, primarily little bluestem, under a light tree canopy.

## **ILLUSTRATION E**

The archeological cuts, field road, volunteer paths, power line road and other intrusions would be treated in the same manner as in Alternative II.

Development would include a paved parking area of the same size and description as in Alternative II with the interpretive trail to the fortification and the River Trail both beginning at the parking lot as in the previous alternative. The existing rest rooms and source for drinking water would continue to be used as in Alternative II. In addition water would be available at the parking area in association with a small interpretive shelter featuring two orientation panels. Bike racks and benches similar to Alternative II would be located at the parking area (see Proposed Parking Lot Plan). A single orientation panel would be located near the existing rest rooms. Safety concerns would remain the same as in Alternative I. A fence would be located along the southern boundary of the site to delineate the historic site or zone as well as the boundary of the property.

Interpretation. The location of the interpretive trail would remain essentially the same as Alternative II, except that the boardwalk or elevated area in Lunette Palmer would be enlarged so that visitors could view more of the fortification walls (see Drawing, Alternative III). The waysides described in Alternative II would be increased by three. These are described below.

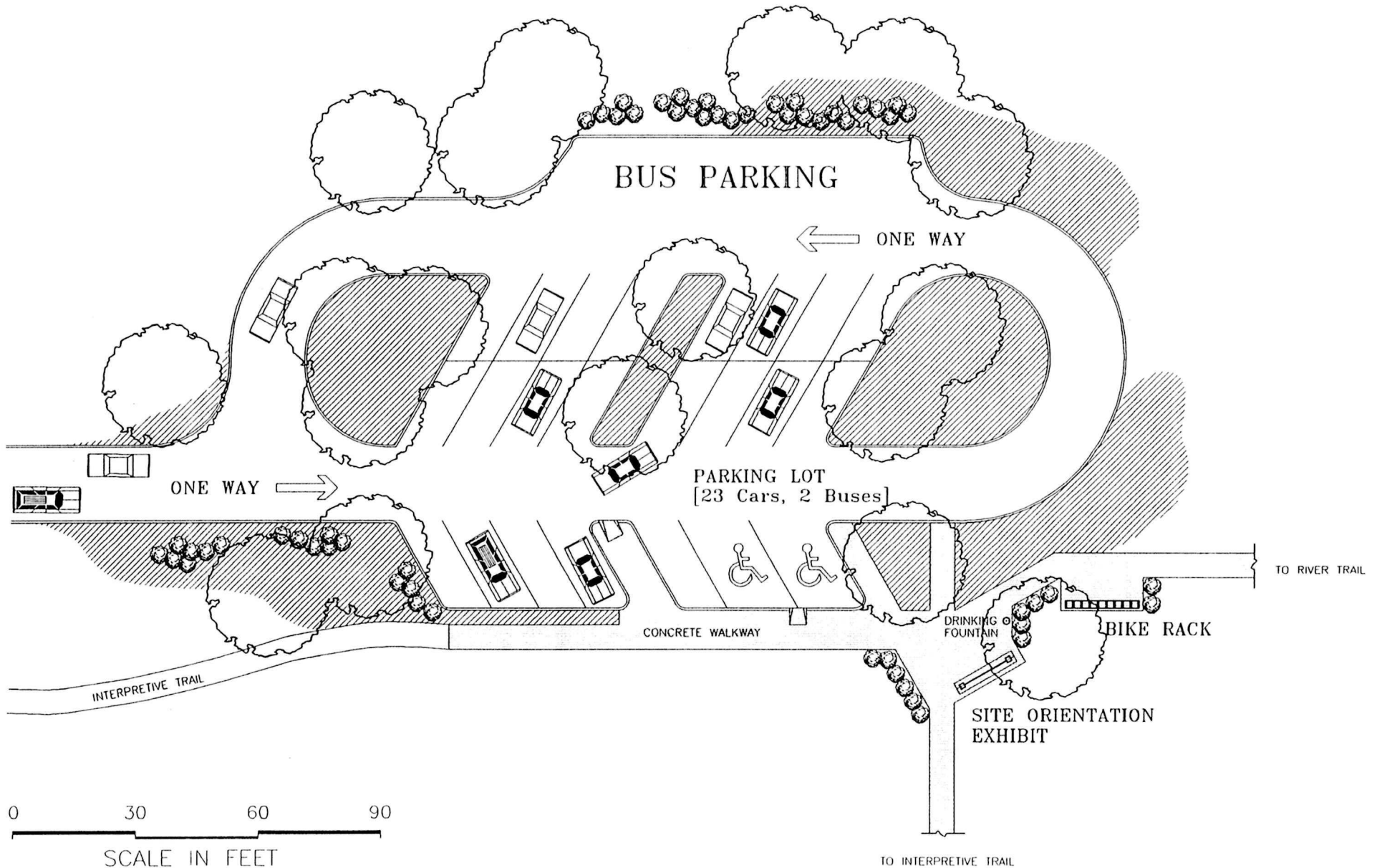
Artillery Magazine - Placed near the remains of the artillery magazine in Lunette Palmer it would discuss in more detail the type and range of the artillery pieces located there. Exhibit will be a standard NPS low profile surface mounted unit with one 36 X 24 inch panel. Exhibit will include a title, line drawing or cutaway view showing the magazine and its elements, identification labels, primary text, and secondary illustrations and text.

Infantry - This exhibit located along the interior of the curtain wall would provide additional information on the role of infantry in the defense of Fortress Rosecrans. Exhibit will be a standard NPS low profile in-ground unit with one 36 X 24 inch panel. Exhibit will include title, illustrations, and text.

Dry Ditch - The third wayside would be located along the front of the curtain wall and would discuss the function of this defensive work and other defensive efforts. Exhibit will be the same type and size as the preceding with title, illustrations, and text.

The orientation panels mentioned in the section on Development are described as follows. The two panels within the interpretive shelter will be the same as described in Alternative II. The single panel located near the present restrooms will contain a map showing the National Battlefield, Fortress Rosecrans, and the general boundaries of Murfreesboro in 1863 along with title, text, and illustrations. It will be a NPS standard single post and panel upright unit with a 36 X 54 inch panel (see Illustration A).

# PROPOSED PARKING LOT PLAN



Publication - A single page site bulletin would replace the unigrid brochure proposed in Alternative II.

Maintenance of the expanded facilities would require increased activity because of the establishment of a tall grass ground cover within Lunette Palmer, a light forest cover in the interior of the fortification along the curtain wall and along the outer wall, and eradication of exotics in Lunette Thomas.

Estimated FTEs and costs for annual operations under this alternative are as follows:

Maintenance - 2 FTE at a cost of \$55,800.

Protection/Interpretation - 1.25 FTE at a cost of \$35,600.

#### **ALTERNATIVE IV - FULL DEVELOPMENT**

Preservation. Removal of debris, both human and natural, and hazardous trees would be the same as Alternative II. Vegetative cover for the remnants of Rosecrans would be a turf cover type utilized at the angle of the traverse and the parapet wall in Lunette Palmer near the viewing platform. Turf cover consists of mown lawn grasses with only an occasional tree. It would be the closest approximation of what was present on the earthworks during the historic period (Illustration F). The remainder of Palmer would have the same ground cover as described in Alternative III. Along Curtain 2 the areas to be interpreted would have a tall grass cover with the remainder in light forest cover. The treatment of the 15-20 feet east of the interpretive trail would be the same as described in Alternative II. The entire front of Curtain 2 will be in light forest cover. In this proposal the interpretive trail would be extended into Lunette Thomas and the lunette, both interior and exterior, would be maintained in forest cover.

Preservation and restoration of the earthworks would be the same as described in Alternative II with the additional work required to preserve Lunette Thomas--elimination of volunteer paths, erosion, and rodent control.

Development would be the same as Alternative III plus the extension of the interpretive trail into Lunette Thomas. The trail will make a loop and rejoin the main trail that will exit at the south end of the curtain wall as in Alternatives II and III (see Drawing for Alternative IV).

Interpretation would be expanded from what is described in Alternative III to include audio stations at the interpretive shelter, on the elevated walkway in Palmer, at a location along the curtain wall, and at the point where the trail into Lunette Thomas begins. A depiction of audio station is on the lower portion of Illustration D. Visitors would have the option of

to the parking lot via the trail at the south end of Curtain 2 or taking the trail that will form a loop within Lunette Thomas. There will be three wayside exhibits in Thomas which will deal with interpretation of the natural resources of the area.

Vegetation - Exhibit will be a standard low profile in-ground unit with one 36 X 24 inch panel (see Illustration D). Exhibit will include title, text, illustrations, and identification labels of common plants and or appearance in four seasons.

Wildlife - Exhibit will be a standard low profile in-ground unit with one 36 X 24 inch panel. Exhibit will include title, text, illustrations, and identification labels of common animals found in the area in four seasons.

Resource Management - Exhibit will be a standard low profile in-ground unit with one 36 X 24 inch panel. Exhibit will elaborate on Lunette Thomas exhibit proposed in Alternative II.

Publications - Same as Alternative III

Audio Station Waysides will be as follows: Orientation Wayside with a 30 second introductory audio message; Vista from Lunette Palmer will have a 30 second audio message using original sources describing historic conditions and events; Curtain Wall will consist of a 30 second audio message describing historic conditions and/or events; Lunette Thomas, an audio message of the same length as the others describing natural conditions when the Fortress was constructed.

Maintenance will increase substantially since the turf cover proposed for a portion of Lunette Palmer requires intensive maintenance to assure its growth and to protect the historic earthworks. The tall grass cover along the interior of the curtain wall will also require more maintenance. The additional trail within Lunette Thomas, the audio stations, and the three additional waysides will add to the maintenance requirements. Trash collection and pick up and other facets of maintenance of the area will remain the same as for the other alternatives.

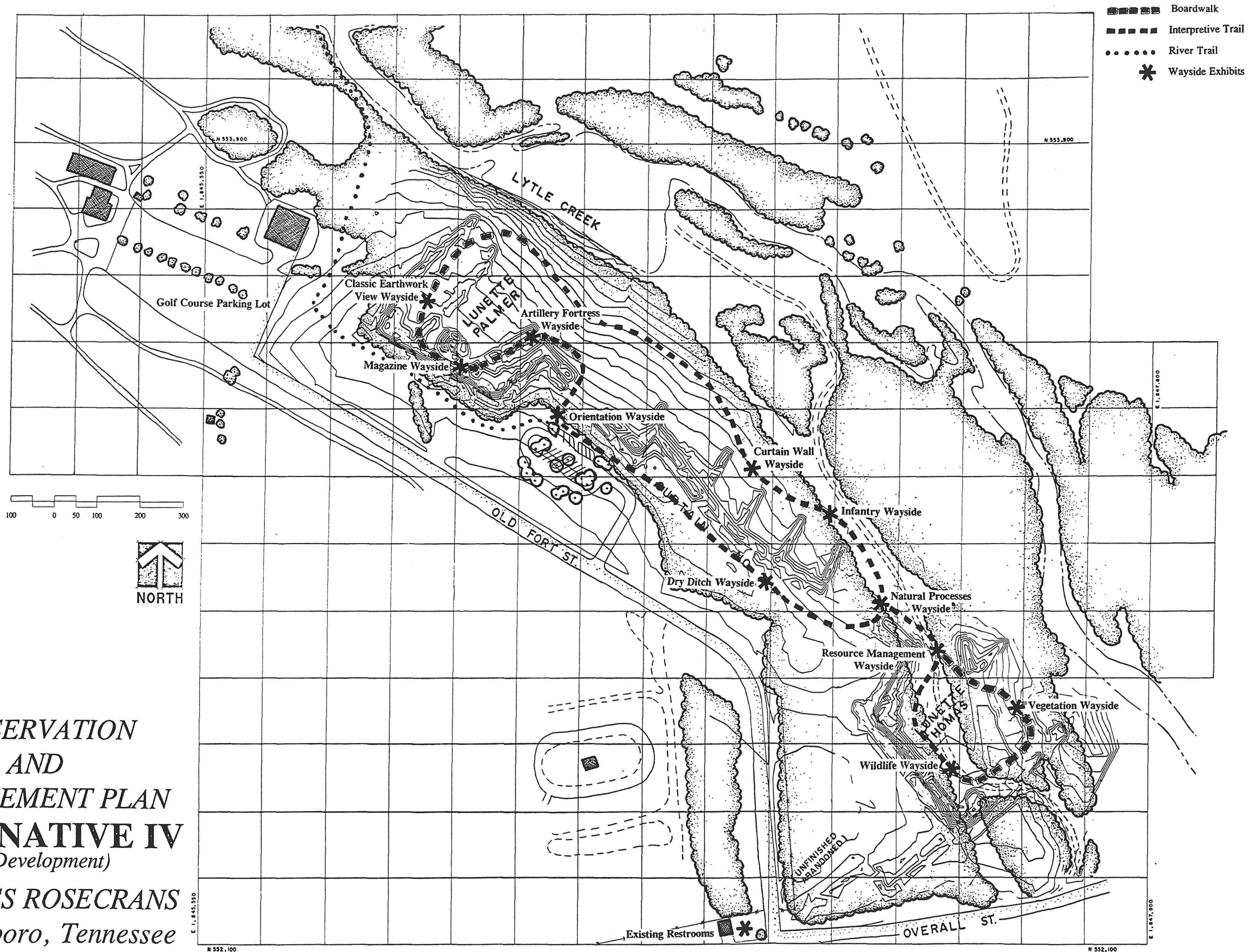
Estimated FTEs and costs for annual operations under this alternative are as follows:

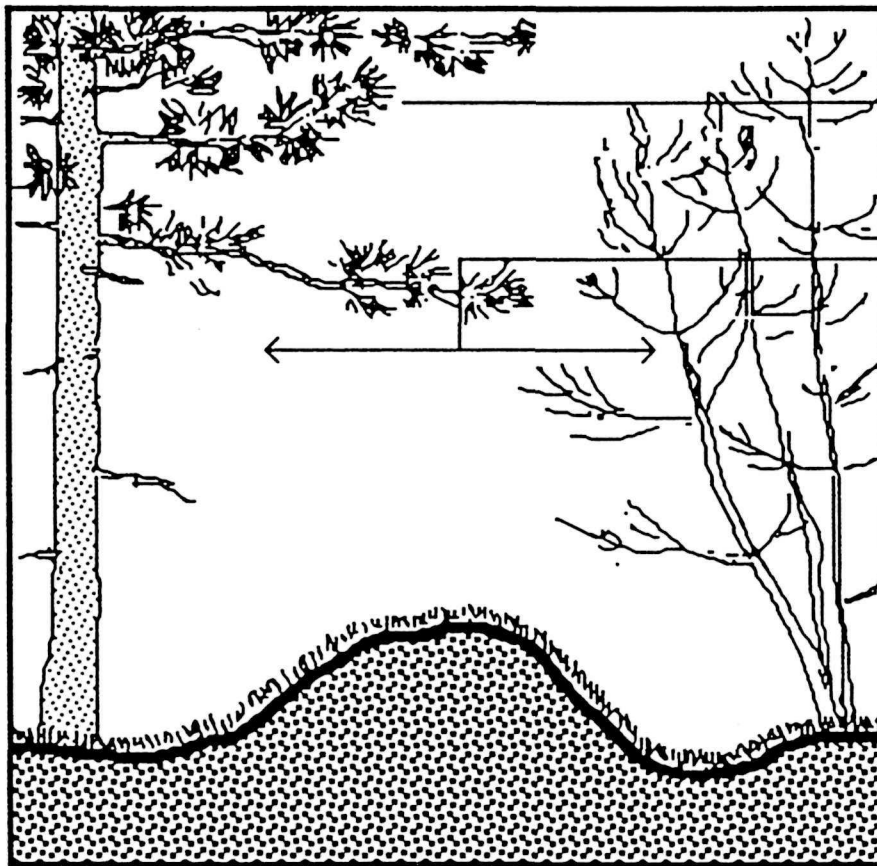
Maintenance - 2.5 FTE at a cost of \$69,000.

Protection and Interpretation - 1.75 FTE at a cost of \$47,500.



**PRESERVATION  
AND  
MANAGEMENT PLAN  
ALTERNATIVE IV**  
*(Full Development)*  
**FORTRESS ROSECRANS**  
*Murfreesboro, Tennessee*





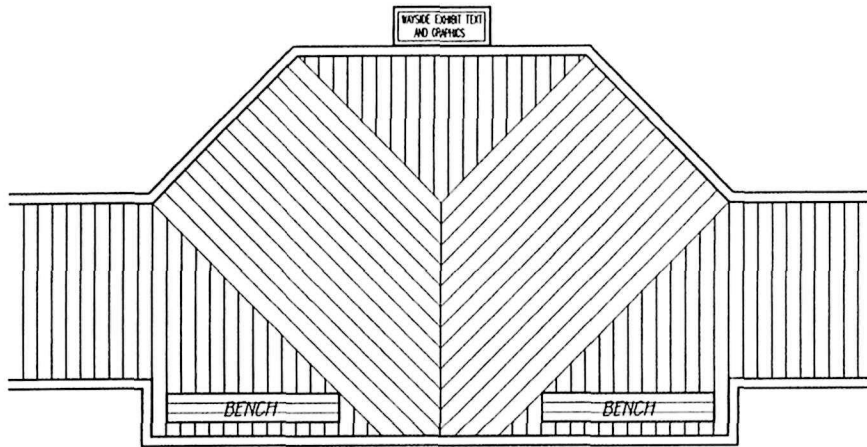
CANOPY SHOULD BE REPLACED AS TREES ARE LOST

OVERALL CANOPY SHOULD BE OPEN ENOUGH TO SUSTAIN TURF BUT CLOSED ENOUGH TO PROTECT EARTHWORKS FROM THE EFFECTS OF SUN AND RAIN

### **Recommended Field Cover Types: Turf**

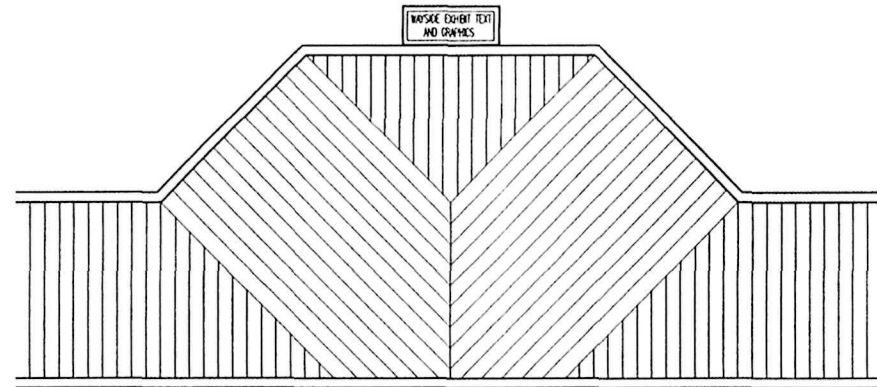
Mown lawn grasses, with occasional groves and specimen trees. Turf should be managed to be dense and with a continuous cover to prevent erosion.

## **ILLUSTRATION F**



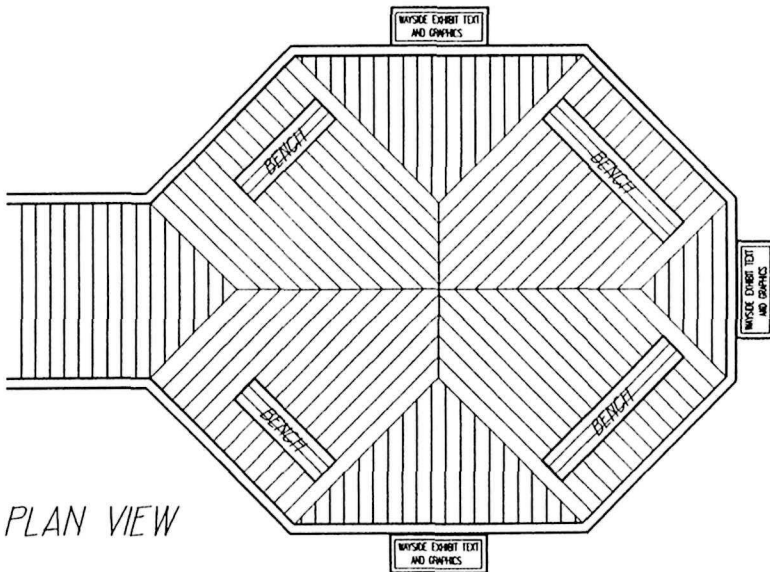
PLAN VIEW

0 2 5 10 FEET  
SCALE



PLAN VIEW

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SCALE

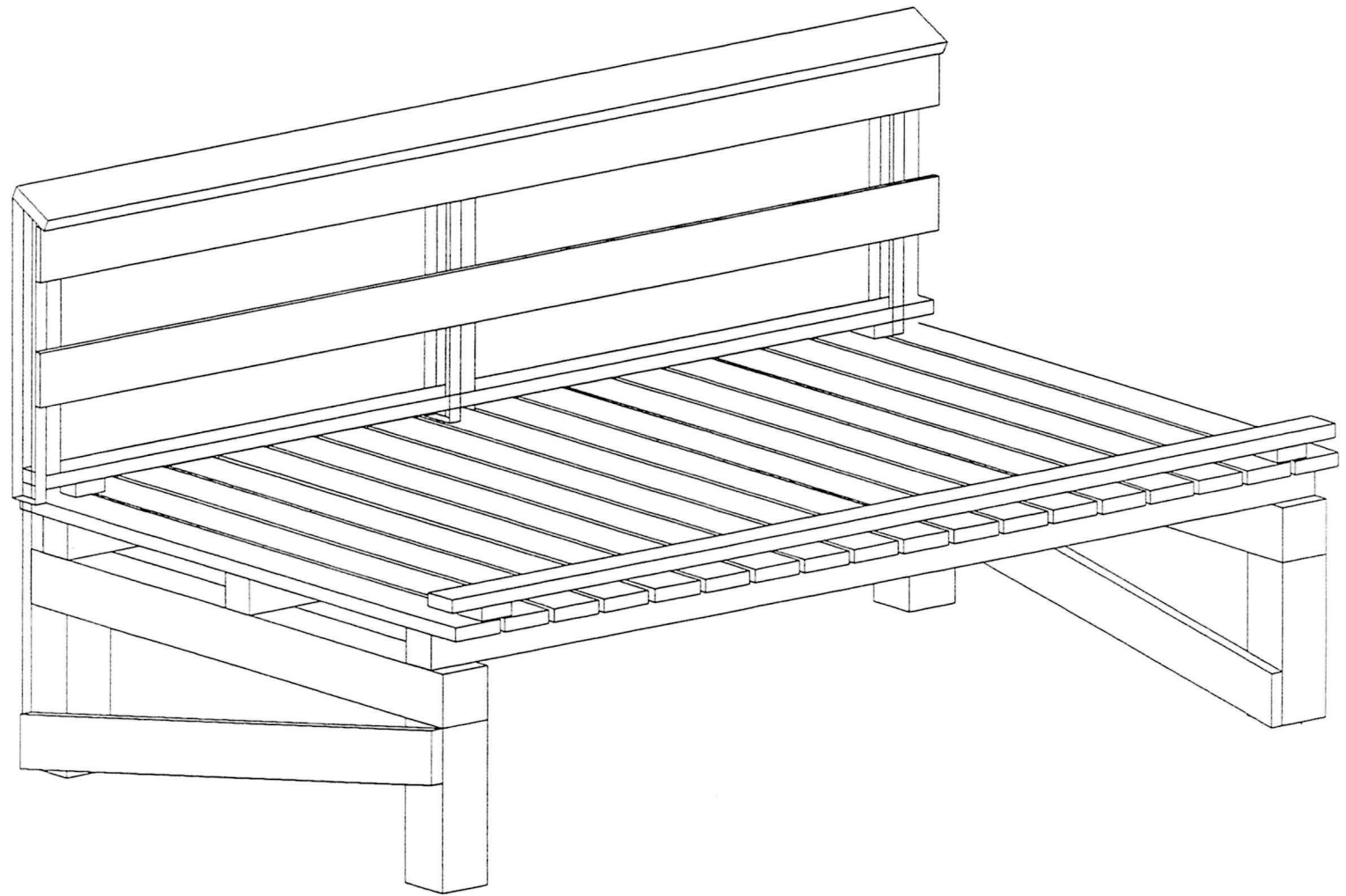


PLAN VIEW

0 2 5 10 FEET  
SCALE

**PROPOSED DESIGN CONCEPTS  
FOR BOARDWALK WAYSIDES**





**PERSPECTIVE VIEW  
OF SECTION OF BOARDWALK**

**ENVIRONMENTAL ASSESSMENT**  
**of**  
**ALTERNATIVES FOR PRESERVATION AND MANAGEMENT**  
**FORTRESS ROSECRANS**

Introduction

The four alternatives for preserving and managing Fortress Rosecrans were developed in response to 1987 legislation directing the Secretary of Interior to prepare a plan for the preservation of the remnants of the Fortress. Each alternative considers preservation of the earthworks and establishment of appropriate vegetative cover. Development includes parking, an interpretive trail with wayside exhibits and other visitor facilities. Each alternative is described below in Part I. Part II discusses the environmental impacts, including effect on cultural resources of each alternative and how each action can or will be mitigated.

I. Description of Alternatives

The first or "No Action" alternative leaves the natural and cultural resources in their existing condition with the following exceptions. Safety hazards, e.g., sinkholes, hazardous trees, etc., would be appropriately mitigated or eliminated. The powerline road east of the fortification would be gated. An orientation sign would be available at the existing parking area. The river trail that will link Fortress Rosecrans and Stones River National Battlefield would terminate at existing parking areas. The existing facilities at the entrance to Old Fort Park would continue to be used by visitors.

Alternative II would establish a "light forest cover" at Lunette Palmer, while a native forest cover with some vista clearing would be established along the curtain wall. All natural and manmade debris would be removed. Earthwork cuts from a farm road and archeological excavations would be filled. Volunteer paths would be obliterated. Entrance into the earthworks would be through the historic entrance between Lunette Palmer and Curtain Wall 2. A parking area with bike racks, benches, etc., would be constructed near this entrance. The river trail would terminate at this parking area. A boardwalk to the top of Lunette Palmer and a trail around the curtain wall would take visitors past 5 wayside exhibits interpreting the story of Fortress Rosecrans. Potential safety hazards would be treated the same as Alternative I. Rodent and erosion control would be undertaken.

Alternative III described as moderate development expands on Alternatives I and II. Treatment of natural and manmade debris, hazardous trees, safety concerns, utilization of

existing facilities, and development of a parking lot is the same as in the first two alternatives. A water fountain would be located in an interpretive shelter near the parking lot. Under this alternative a "tall grass cover" would be established on Lunette Palmer. Tall grass cover includes a light tree canopy. A light forest cover would be established along the interior and exterior of the curtain wall. Lunette Thomas would be cleared of exotic plants and native forest would remain. The boardwalk in Lunette Palmer would be extended. The trail would follow the same route and the number of waysides would be increased to a total of eight.

The final alternative has all the elements of the previous alternatives plus developing a loop interpretive trail into Lunette Thomas. Vegetation cover within the earthworks will consist of turf at Lunette Palmer, tall grass along the interior curtain wall and light forest on the exterior. Forest cover would be maintained in Lunette Thomas.

## II. Environmental Impacts of the Alternatives

With the exception of Alternative I, No Action, all the alternatives propose the same actions - the only difference being in degree or extent. The differences are most noticeable in the vegetation management proposals for Alternatives II, III, and IV. For this reason and because Alternative III has been identified as the preferred alternative by the City Council of Murfreesboro and the directorate of the Southeast Region, National Park Service, this section will discuss the impacts of that alternative on the natural and cultural resources.

In late July 1991 copies of the task directive and the four alternatives developed during the initial meeting of the planning team were sent to the Tennessee State Historic Preservation Officer (SHPO). Prior to the second meeting of the team in mid-August, these were reviewed with a member of his staff and no objections were raised. Subsequently copies of the more detailed plan and the Environmental Assessment were sent to the SHPO, and he was made aware that Alternative III was the preferred alternative. Copies of correspondence between the SHPO and the National Park Service and the draft plan were provided to the Advisory Council in early November. At the end of December the National Park Service was in consultation with both the Council and the SHPO. Compliance with Section 106 of the National Historic Preservation Act and the Programmatic Memorandum between the NPS, the SHPO, and the Council will be completed prior to any action that would affect the site. All actions described in this plan will comply with National Park Service Management Policies and NPS-28, Cultural Resources Management Guidelines.

Vegetation Management is described in Appendix A of the plan. The primary goal is to utilize native species to establish and maintain a mixture of environments that will preserve the earthworks while creating sufficient visibility to interpret the resource. Under Alternative III the most extensive preservation work will be on the northern half of Lunette Palmer. This area will be developed as a tall grass ecosystem. The remainder of Lunette Palmer and Curtain # 2 will be placed in a light forest cover. Lunette Thomas, the southernmost earthwork, will be maintained in forest cover, after exotic species are removed.

An initial step in vegetation management will be the removal of hazardous trees that present either a danger to visitors or to the stability of the earthworks. Some 25 or 30 large trees will be removed along the parapet and inside the fort. Removal will be accomplished by using loaders that can lift the heavy logs and transport them without damaging the earthworks. Although most of the trees will be removed in the initial preservation effort, the project will be spread over three or four years to prevent destabilization of the existing microenvironment. Rate of removal will also depend on how quickly grass and shrub growth occurs in the areas opened up by removal of trees.

Presently exotics such as privet and honeysuckle have established dense communities in the two lunettes. The most efficient means to clear this undergrowth is through a controlled burn over the 14 acres bounded by the entrance road, Overall Street, the power easement road, and the cleared area of the golf course and the golf course maintenance building. After the initial burn the area from 15 or 20 feet east of the interpretive trail to the powerline road would receive no further treatment. Although both honeysuckle and privet will reemerge, wick application of a NPS approved herbicide will control it without damaging desirable native species. The prescribed burn will create smoke and haze for one day.

Following the prescribed burn there will be selective pruning or removal of existing understory as well as the introduction of native species in some areas. The goal will be to establish the basic light level necessary for the desired ground cover. The portion of Lunette Palmer to be maintained in tall grass will require more extensive clearing. Along both the interior and exterior faces of the curtain wall, small trees will be thinned and gradually removed to encourage the growth of native grasses or ground cover. For more specific details see the Vegetation Management Plan (Appendix A).

This proposal for vegetation management will protect and preserve the existing earthworks while reestablishing native species as the forest, understory and ground cover. Short term negative effects will include increased noise and smoke during the initial period of tree removal, reduction of the understory, and the controlled burn of existing groundcover of exotics. Positive effects in the short term will include evidence of commitment by the National Park Service to opening up for public use a resource that had relatively little utilization by the general public. The long term positive effects have been mentioned in the preceding paragraphs. There should be no long term negative effects.

Preservation of the Fortress, restoration of damaged sections, and elimination of volunteer paths that currently enter the area from the east and west will include the following actions. Exposed and compacted earth on trails within the fort and along the parapet will be treated as described in the plan for vegetation management and preservation (Appendix A) to encourage the growth of grass. Two areas, the archeological cut in the magazine wall in Lunette Palmer and the field road or erosional cut at the south end of curtain wall #2 will require restoration through the use of live woody material either in single stakes or in bundles. These should be

species that root easily and will develop into mature shrubs. Earth may be added to reestablish existing contours where needed. The guideline for this work is the Earthwork Management Manual mentioned in Appendix A. Elimination of volunteer paths will be accomplished by blocking them with brush or trees until live stakes have rooted and closed off the paths. The brush or trees can then be removed. Along with elimination of volunteer paths, the powerline road to the east of the fortress will be gated to eliminate unauthorized access and trash dumping along the road.

All the actions set forth above will have positive short term and long term effects in preserving Fortress Rosecrans.

Removal of Natural and Manmade Debris will occur prior to or concurrently with the two activities previously described. Natural debris would include fallen or cut trees and branches that currently are scattered throughout the area. Man created debris would be material dropped or dumped in the area and more importantly the removal of old woven wire fences, especially along the front of Curtain Wall # 2. These will become more visible after the controlled burn has removed some of the ground cover. Although not strictly under the removal of debris, the National Park Service will also place steel grates over existing sinkholes within the site to protect visitors from possible injury.

The effect of the above activities will be positive since removal of debris will improve the general appearance of the site. The remnant fencing dates from the post Civil War era and reflects various agricultural uses of the land in the last third of the 19th and first several decades of the 20th Century. The use of grates over the several sinkholes will allow them to continue to function as part of the natural environment.

Construction of a Parking Lot for 23 cars and 2 buses will serve both visitors to Fortress Rosecrans and those utilizing the River Trail from Rosecrans to Stones River National Battlefield. The parking lot will be located to the south and east of the historic entrance into the fortifications—see map for Alternative III in plan. This area currently is part of an open grassy area that is used by visitors to the fortification. Prior to construction an archeological survey with testing of the parking area will occur. The design of the parking lot includes trees and other plantings to soften the visual impact when viewed from the fortress. A water fountain will be located in an interpretive shelter adjacent to the parking area. A water line will be run from the water main that serves the golf course clubhouse.

Although the parking area will be visible from the interior of Rosecrans at specific locations it is necessary for the accommodation of visitors. The design as set out in the plan to preserve and manage Fortress Rosecrans includes screening of the parking lot.

A Boardwalk and Interpretive Trail will lead from the parking lot into Fortress Rosecrans. The boardwalk will begin inside the entrance near the eastern end of Lunette Palmer, it will run along the inside of the earthwork passing between the magazine and top of the parapet

and continue in a semi-circle while descending back to grade. From that point an interpretive trail will run along the inside of the earthworks past Curtain Wall #2 and the traverses and exit between the Curtain Wall and Lunette Thomas. The trail will then continue along the front of the curtain wall and dry ditch and return to the parking lot as shown on the plan for Alternative III. Final plans and design for the boardwalk and the interpretive trail have not been done. The estimated length of the boardwalk will be 850 to 1,000 feet and the trail will be approximately 2,000 feet long.

The general route of the 6-foot wide interpretive trail will be established on topographic sheets and on the ground. Archeological survey and testing of a 30-foot wide corridor (15 feet on either side of the centerline of the trail) will take place prior to construction. Because the exact location of the support posts and other ground disturbance associated with the boardwalk can not be completely determined until design is completed and construction begins, an archeologist will be on hand to monitor construction of the boardwalk.

The boardwalk and railings should not be visible from the exterior of the fortress except at a few locations, including the "Classic Earthwork View" wayside which will provide a vista of the surrounding area. It will be constructed of wood and will blend into the surrounding vegetation. The trail will be hard surfaced and built of material that will blend with the ground. Because most of the trail will be within the hundred year flood plain, this will be a consideration in selection of materials. The boardwalk and trail with the eight interpretive waysides will provide controlled access into the fortress and an educational experience for the visitors. There will be a short term negative effect of noise and dust during construction, however the long term effects will be beneficial.

Rodent Control specifically of the groundhog population will be needed. The burrows of these animals allow large amounts of rainwater to penetrate into the earthworks which can result in undermining the works. Initially the removal of the dense cover of honeysuckle and privet will encourage some of the present population to relocate. Old and new borrows that are discovered will be filled in to discourage present residents and those seeking to relocate to the area. The last resort will be trapping or other methods of removal. It is hoped that loss of habitat and increased presence of humans will solve the problem.

Rodent relocation in large numbers could have an impact on adjacent areas such as the golf course or level areas within or outside of the fort. However, a limited number or extended period of relocation could be absorbed by the surrounding area.

Natural Resource Concerns have been addressed throughout this Environmental Assessment. The remnants of Fortress Rosecrans are located south of Lytle Creek and within the hundred year floodplain of the creek and the West Fork of Stones River--see existing conditions or vicinity map in the plan. The U.S. Fish and Wildlife Service has provided the following list of species which are on the federal List of Threatened and Endangered Species or are being



considered for listing. These species may be found in or around Rutherford County, Tennessee, where Fortress Rosecrans is located.

SPECIES	STATUS
Gray Bat ( <u>Myotis grisescens</u> )	Endangered
Tan riffle shell ( <u>Epioblasma walkeri</u> )	Endangered
Stones River bladderpod ( <u>Lesquerella stonensis</u> )	Category 1
Eastern woodrat ( <u>Neotoma floridana magister</u> )	Category 2
Tennessee cave salamander ( <u>Grinophilus pallescens</u> )	Category 2
Cleft phlox ( <u>Phlox bifida stellaria</u> )	Category 2
Large rock-creep ( <u>Arabis persteltata</u> var. <u>ampla</u> )	Category 2
Eastern blue-star ( <u>Ansonia tabernaemontana</u> var. <u>gattingeri</u> )	Category 2
Gattinger's lobelia ( <u>Lobelia appendiculata</u> var. <u>gattingeri</u> )	Category 2

It is the determination of the National Park Service that the activities outlined in this Environmental Assessment are not likely to adversely affect any of the above listed species.

**The following individuals, agencies, and organizations were involved in preparation of the plan, were contacted for information, or reviewed the plan in draft form:**

The Planning Team - See listing at end of the Preservation and Management Plan,

Jim Widlac, United States Fish and Wildlife Service, Cookeville, Tennessee,

Southeast Regional Office of the National Park Service and Stones River National Battlefield who read the draft document during plan review,

Recreation Commission and City Council of Murfreesboro who reviewed the plan in September and early October of 1991, and

Tennessee State Historic Preservation Officer and his staff (who reviewed the task directive and first draft as part of early consultation process).

**APPENDIX A**  
**Vegetation Management and Preservation, Fortress Rosecrans**



# VEGETATION MANAGEMENT AND PRESERVATION OF FORTRESS ROSECRANS

## MURFREESBORO, TENNESSEE

### Introduction

Fortress Rosecrans was a massive earthwork fortification constructed by the Army of the Cumberland during the winter of 1863. Major General William S. Rosecrans, commanding that Army, initiated the construction of this extensive work in order to secure Murfreesboro as a logistical base for operations in Middle Tennessee. In addition, the fortress served Union forces in the region as a place of refuge from Confederate raids and incursions. As events proved, the rapid movements of the Union army to Chattanooga in the late summer of 1863 made its use as a logistical base one of secondary importance. During Hood's invasion of Tennessee in 1864, the mere presence of the fort discouraged Confederate forces from a direct attack on Murfreesboro.

The preservation of Fortress Rosecrans can best be accomplished by utilizing native species to establish and maintain a mixture of environments, henceforth defined as "Tall Grass", "Light Forest" and "Forest" cover types, on the total remains of the fortification.<sup>1</sup> Groundcover types should be selected that will best achieve the goals of preservation and visitor appreciation of the site. The guiding principle of earthwork preservation work is to encourage the covering of the works with native vegetation with the least amount of intervention and ground disturbance. In the case of Fortress Rosecrans, the foundation for preservation is already in place and requires a systematic plan to accomplish the preservation goal.

### I. Current Conditions

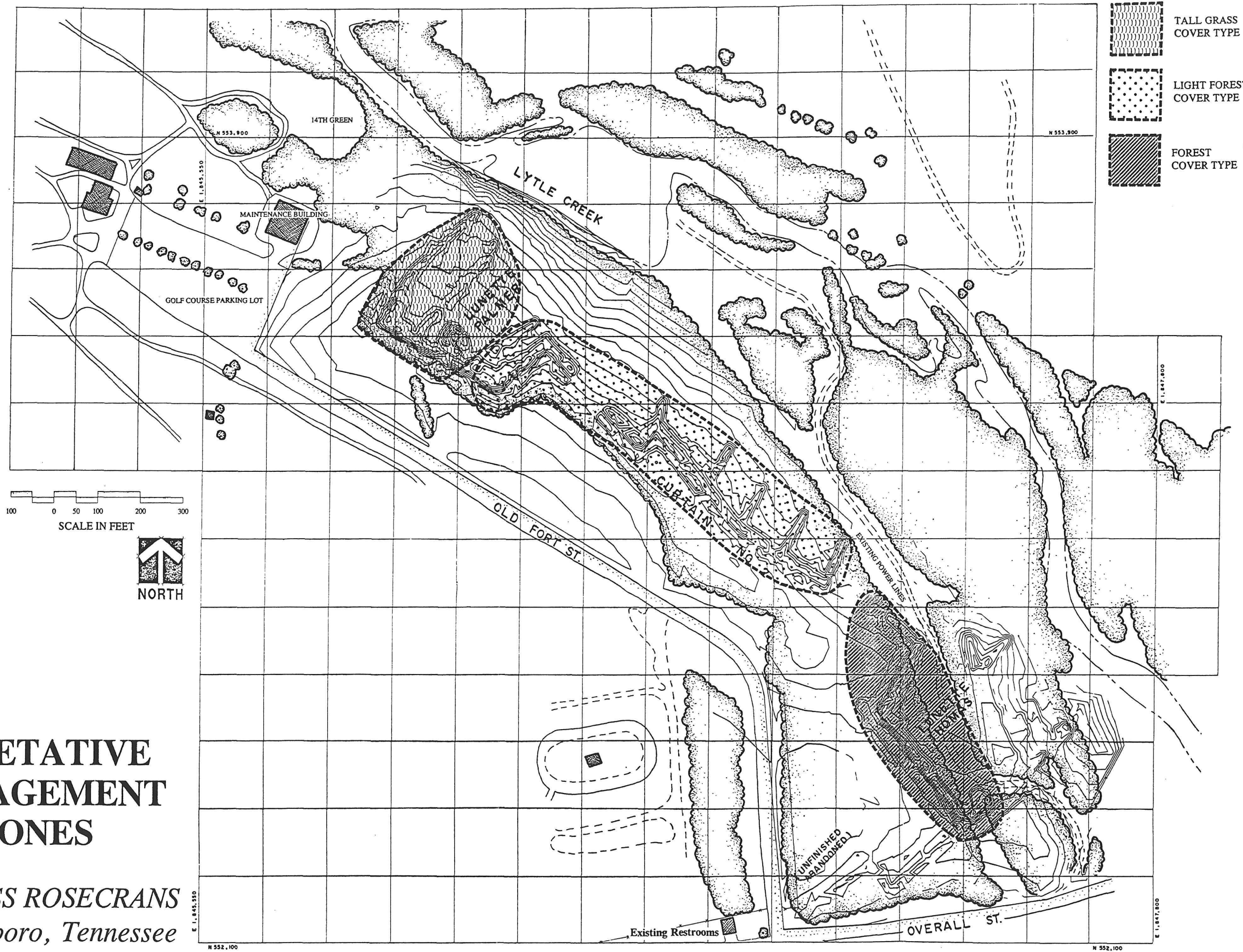
The portions of the fort considered for preservation are Lunette Palmer, Lunette Thomas, and Curtain #2 which lies between them. These features comprised the southwestern face of the work, and guarded the approach to Murfreesboro via the Franklin Road. Total area considered for preservation work consists of approximately 13.25 acres, the works proper occupying approximately 10.15 acres. The total frontage is approximately 3100 linear feet, plus 1150 feet in traverses, for a total of 4250 linear feet.<sup>2</sup>

In general, these remaining works are stable. Problem areas are primarily those places where human impact has resulted in bald, compacted soil, and breaches in the work caused by recent archeological investigations. Several old field roads, and more recent trails caused by unauthorized use of the site by ORV's (principally motorbikes) were also noted at the site.

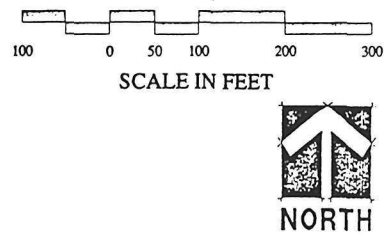
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<sup>1</sup> Earthworks Landscape Management Manual, National Park Service, 1989, pp. D-1 thru D-11.

<sup>2</sup> For breakdown of acreages and distances see Appendix 1.



- TALL GRASS  
COVER TYPE
- LIGHT FOREST  
COVER TYPE
- FOREST  
COVER TYPE



# VEGETATIVE MANAGEMENT ZONES

*FORTRESS ROSECRANS  
Murfreesboro, Tennessee*

The scarp, dry ditch and counterscarp are covered with small trees, principally Sassafras (*Sassafras albidum*), Eastern Redcedar (*Juniperus virginiana*), and several species of oak. Small Red Cedar is found in profusion along the exterior face of Curtain #2. The parapet is covered with low shrubs, grasses and small trees. In addition, burrowing mammals inhabit the area. Numerous groundhog burrows were noted along the top of the parapet at Lunettes Palmer and Thomas.

The interior of the works have dense growth of shrubs and mature trees. In several places the interior of the works (especially Lunette Thomas) are badly overgrown by exotic species, the most common being Japanese honeysuckle (*Lonicera japonica*). Privet (*Ligustrum* L.) of several species is widely distributed, with concentrations at Lunette Palmer and the north portion of Curtain #2. Periwinkle (*Vinca* L.) is found in abundance in dense, shady areas, especially the eastern portion of Curtain #2,

Several old woven wire fences are on the site. The most extensive is in front and along the parapet of Curtain #2. Remains of other fences were also noted, but due to the overgrowth their extent and direction could not be noted. Very little debris and trash were noted within the works, however the area along the power easement right-of-way has been used as a dump. Several piles of household and building trash were noted in this area.

#### Immediate Preservation Needs

It is essential that ORV and bike trail access to the fort be blocked-off as soon as possible. This activity has been the one most destructive use of the site. The roadway that runs along the power easement is the primary access route for ORVs, as well as trash dumpers. The other main access is an old field road near the gap between Curtain #2 and Lunette Thomas. This route does not exhibit much current use by ORVs, but it does provide easy access for relic hunters. Evidence of digging was scattered throughout the interior.

Native grasses and low shrub species that will provide desired ground cover and low canopy need to be identified. The assistance of subject matter experts will be necessary in this task. The soil should be tested to determine pH and what nutrients (if any) are needed to support desired ground cover plants.

## II. Preservation Work

### General

Under the preferred Alternative (#3) the most extensive preservation work will be concentrated on the northern half of Lunette Palmer. This area will be placed in a "Tall Grass" ecosystem from the traverse adjacent to the magazine extending westward and encompassing the northwest parapet, or approximately 1/3 of the work. The remainder of Palmer and all of Curtain #2 would be placed in a "Light Forest" covering. Lunette Thomas would be maintained in a "Forest" cover.

The other alternatives offer more or less involved variations of the above treatments. Minimal treatment to provide for visitor safety and access, and achieve stabilization of the works includes: hazardous tree removal, exotic eradication, and some level of restorative treatment to problem areas.

### Removal of Potentially Hazardous Trees

Removing potentially hazardous trees is necessary in all areas accessible to visitor use. This project will involve removing trees that present a danger to visitors (i.e. dead, dying or diseased trees), and those that pose a threat to the stability of the earthworks. Unstable trees growing directly on the works could gouge holes in the soil if uprooted by windfall. Several trees have exposed root knees that indicate a serious erosional level. Removal of these trees and establishment of grasses and native shrubs in their place is critical to stabilization.

Some 25 to 30 large trees should be removed from along the parapet and inside the fort. There are several large Black Cherry trees (*Prunus serotina*) on the site. Because this species is especially prone to windthrow, these should be removed first. Large logs cannot be removed from the fort by skidding, as this would damage the earthworks and desirable vegetation. Loaders capable of lifting the heavy logs should be utilized.

Tree removal should take into consideration the possible abrupt destabilization of the existing microenvironment and windbreak provided by surrounding mature trees. Trees should be marked for removal with paint, giving careful attention to staged removal, especially understory trees. Though it is anticipated that much tree removal will be accomplished in the initial preservation phase, the total project should be spread over a 3 to 4 year period. Rate of removal should be dependent on erosion potential and the rate of grass and shrub growth. Trees removed from the interior should be cut as close to the ground as possible, and the root system left in place.

### Clearing Underbrush and Exotic Species

The area targeted for preservative treatment is covered in several exotic species, as noted above. The most significant feature of this zone is the lack of an intermediate understory of native shrubs. This can be accounted for by the grazing of cattle and other ruminants in the boundary of the fort remains.<sup>3</sup> This lack of low growth has permitted privet and honeysuckle to establish dense communities within Lunettes Palmer and Thomas. The carpet of periwinkle on the eastern third of Curtain #2, however, has provided an excellent groundcover that has protected the works.

Privet is especially difficult to eradicate. Removal by hand would be labor intensive and probably require extensive use of herbicides by direct application to stumps, to bring it under control. Honeysuckle is dense at Lunette Thomas and, while less difficult to remove by hand than privet, would require herbicide spraying treatment. General use of herbicides in these areas could have an adverse effect on the establishment of native grasses and shrubs. The rapid regeneration rate of these exotics has the potential for an ongoing maintenance problem and expense.

It is recommended that the most effective way to clear the undergrowth is by means of a prescribed burn. The burn area would encompass approximately 13.75 acres. The area is bounded by two paved roads, the power easement road and the cleared area around the city maintenance buildings. These features, coupled with the flat terrain, make for an excellent firebreak. Cost of a prescribed burn would be approximately \$100.00 per acre. Once the burn is accomplished, the area between the proposed trail and the power easement would receive no further direct treatment.

A well timed prescribed burn can kill most stands of Japanese honeysuckle. Excellent results were obtained at Cumberland Gap in early April, when new leaves were approximately one-fourth to one-half inch in length. Fire at other times of the year will not kill this species. Privet species are easily killed to ground level with fire, however this plant will sprout from the base. A wick application of the herbicide "Amate" will effectively control the reemergence of both honeysuckle and privet without harming desirable native species. Periwinkle would not be harmed by a rapid ground fire, as the area in which it exists has very little ground fuel.

### Bare Earth and Volunteer Trails

Exposed earth and trails along the top of the parapet need to be stabilized and treated to encourage the succession of grasses. Much of the methodology will be dependent on the soil test results, but generally speaking the treatment will entail the use of biodegradable netting,

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<sup>3</sup> Information on grazing of farm animals confirmed by personal conversation with Dennis Rainer, City of Murfreesboro, and Robert A. Ragland, long time resident of Murfreesboro.



mulch, and revegetation by grass plugs in combination with broadcast seeding. A few areas that exhibit deep gouges and or erosional patterns will require more extensive application of techniques identified in the "Earthworks Landscape Management Manual", Section I.

Most of the impacted areas exhibit bare, compacted soils caused by intermittent foot traffic. These less severely damaged areas should require only basic treatment to establish the desired vegetation in order to provide a good growing medium and fill in slight depressions. This can be accomplished by the application of suitable topsoil and restriction of foot traffic. The topsoil should be lightly compacted to prevent runoff, mulched, netted, and plugged/seeded with appropriate grass species. It may be necessary to erect temporary barriers and informational signs, while this work is in progress.

Two areas have been noted that will require more extensive rehabilitation. The first consists of a complete cut-through in the magazine wall at Lunette Palmer caused by an archeological excavation in the early 1980s. The other is a bald, compacted erosional slough on the western end of the parapet of Curtain #2. These areas will require the use of rehabilitative measures that may include the use of "live stake" and or "live fascines" applications.<sup>4</sup>

Small trees along exterior slope need to be thinned and gradually removed. This work should proceed slowly because a rapid removal of existing cover could accelerate the current erosion pattern. The speed of removal should be staged to provide the conditions of soil and light necessary for the growth of native grasses, as well as achieve the required level of clearing for viewing the exterior slope and vistas. The vista from Lunette Palmer will require the most extensive clearing. In addition, some thinning of trees along the scarp of Curtain #2 will be necessary in order to provide better visibility of the slope for interpretive exhibits.

Trees removed on the exterior slope should be cut 3 to 4 inches above ground level leaving root systems intact. Soil conditioning and grass introduction, if necessary, should be accomplished as this work progresses. On bare or poor soil, organic netting should be staked in place, with mulch and grass plugs used to stabilize exposed earth. In identified or potential erosional channels, water bars of organic material can be used to slow soil loss, until a cover has been established.<sup>5</sup> Trees in the dry ditch and on the counterscarp, as well as those on the trail in front of Curtain #2, should be selectively thinned to provide a stable canopy, to promote a healthy forest environment, and for aesthetic appeal.

### Restoring Understory

One of the most notable and puzzling features of the site is the lack of a consistent understory of native small trees and shrubs. As noted above, this absence was probably caused by the practice of grazing farm animals on the fort site in the decades prior to the creation of "Old

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<sup>4</sup> See Earthwork Management Manual, p. I-21 and 1-22.

<sup>5</sup> See Earthwork Management Manual, pp. I-21 thru I-28 for illustrations of techniques.



One of the most notable and puzzling features of the site is the lack of a consistent understory of native small trees and shrubs. As noted above, this absence was probably caused by the practice of grazing farm animals on the fort site in the decades prior to the creation of "Old Fort Park". This lack of understory permitted the invasion and dominance of exotic species. In fact it can be reasonably asserted that the current understory is privet.

The prescribed burn would make the selective removal and/or pruning of existing understory in the interior of fort less difficult. This initial work would establish the basic light level necessary for the desired groundcover growth and canopy cover. This work should be timed to minimize impact to exposed earth and especially those areas receiving restorative treatment. A canopy of mature trees, small trees, and low shrubs provides protection from the force of rain on exposed, fragile, or unsettled soils.

In order to promote and perpetuate a healthy woodland environment, some additional understory will have to be created in selected areas, most notably at Lunette Palmer. There are numerous native species that could provide the necessary understory. These species include: Eastern Redbud (*Cercis canadensis*), Flowering Dogwood (*Cornus florida*), Sassafras (*Sassafras albidum*), and Holly (*Illex* sp.) Some specimens of these exist. Others, such as Redbud, could be introduced in areas where they will not affect the earthworks.

#### Mitigation of Rodent Damage

Burrowing rodents especially the groundhog present a serious threat to the long term stability of the works as well as a hazard to visitors. The burrows of these animals are large and deep allowing large volumes of rainwater penetration to undermine the parapet. The burrows themselves are trip hazards to visitors.

Removal of these animals is both a delicate and persistent problem. The groundhog likes the dense cover afforded by the honeysuckle/privet dominated environment present at the site. It is hoped that the destruction of this optimum habitat, that will be accomplished by a controlled burn, will discourage the present population. A routine effort to remove and monitor the exotic vegetation will also accomplish a great deal towards this end.

Old burrows that show no sign of current habitation should be shovel filled with earth and tamped. New burrows can be filled in order to discourage present occupants. As a last resort for persistent infestation, use of more drastic measures such as trapping, smoke bombs or other direct removal methods can be considered. It is hoped that the problem will be solved by habitat destruction and increased presence of humans.

### Suggested Priority for Preservation Work

1. Block off access roads and trails.
2. Remove debris and trash from area.
3. Conduct prescribed burn of preservation area.
4. Remove dead, diseased or physically hazardous trees.
5. Mark and begin removal of trees hazardous to the stability of the earthworks and those needed to provide light levels for selected alternative.
6. As tree work progresses, begin restorative work on impacted soils and repair/prevent rodent damage. Seed and plug other areas with native grasses and shrubs as needed to replace exotics and establish groundcover and understory.
7. Closely monitor area for new erosional patterns and mitigate as necessary.
8. Monitor area for regeneration of exotics and apply necessary treatment.

### III. Maintenance

The "Tall Grass" environment should be maintained by periodic weed-eater mowing. The major purpose of mowing is to suppress shrub growth and encourage the continued health of the native grasses, not to give a manicured appearance to the site. Cutting should be accomplished on a two to three month interval, depending on local growth rate. Grass height should be maintained at approximately 8 to 10 inches. It is important that maintenance activities be scheduled to permit natural reseeding.

Understory trees and shrubs will require occasional pruning to maintain vistas and promote healthy growth. There will be some attrition of new plantings that will require replacement as necessary. Mature trees in and around the fort and trail will have to be removed and replaced as needed to perpetuate the canopy.

Exotic species will require intense monitoring, and removal of intrusive plants accomplished before they gain a foothold. A limited use of herbicides, by direct application, is recommended for resprouting privet. Honeysuckle can be physically removed by grubbing the roots as it reappears. The critical element is a regular monitoring for these (and other) exotics. As the native grasses gain dominance, there will be a decrease in maintenance effort on exotic removal.

The area should be regularly patrolled for adverse use by trail bikes or ORVs. Volunteer trails, other human impacts, and erosion problems need to be mitigated as soon as discovered. Applications of restorative treatments depend on the nature and severity of the damage.

## APPENDIX 1

### ACREAGE AND DISTANCES

#### Acreage:

Lunette Palmer	3.30 acres
Curtain #2	3.10 acres
Lunette Thomas	3.75 acres

TOTAL 10.15 acres

Total burn zone 13.75 acres

This acreage encompasses the area from the tree line in front of the works to the power easement access road, and from the paved road southeast of Lunette Thomas to the westerly parapet of Lunette Palmer.

#### Frontages (in linear feet):

Lunette Palmer	1000
Traverses	400
Total	1400

Curtain #2	900
Traverses	<u>450</u>
TOTAL	1350

Lunette Thomas	1200
Traverses	<u>300</u>
TOTAL	1500
TOTALS	

Frontage	3100
Traverses	<u>1150</u>

GRAND TOTAL 4250

## APPENDIX 2

### COST ESTIMATES FOR CLEARING \*

#### Remove Hazard Trees

Selective tree removal	30 large trees	\$ 320 ea.	\$ 9,600
	50 medium trees	255 ea.	12,750
	50 small trees	210 ea.	<u>10,500</u>
Total for tree removal			32,850

#### Brush/Shrub Clearing

Clear and pile low shrubs/bushes with brush saw (\$ 1,100 per acre)	
Lunette Palmer - 3.3 acres	\$ 3,630
Curtain #2 - 3.1	3,410
Lunette Thomas - 3.75	<u>4,125</u>
Total for basic clearing	\$11,165

Prescribed Burn Cost, \$100. per acre, 13.75 acres	\$1,375
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#### Pruning Shrubs and Trees

Prune trees and shrubs (6' high) - \$29.80 per 1000 sq. ft.	
Lunette Palmer - 3.3 acres	\$ 4,298
Curtain #2 - 3.1	4,024
Lunette Thomas - 3.75	<u>4,868</u>
Total for pruning	\$13,190

#### Restorative Work

Soil preparation and mulch, square yard	\$4.59
Hand seed per 1000 square feet	30.00
Jute netting per square yard	.79
Rehab trails, estimated at 10,000 sq. ft.	\$5,721
Rehab compacted areas, approx. 1/2 acre total	13,672
Plant 50 understory trees (@ \$30.00 avg.)	<u>1,500</u>
Total for restorative work	\$20,893

ESTIMATED GRAND TOTAL, Hand Clearing	\$78,098
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ESTIMATED GRAND TOTAL, Prescribed Burn	\$68,308
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\* Estimates from "Means Site Work Data, 1991", Bare Cost Index.

## **APPENDIX B**

### **Cost Estimates for Preservation, Development, and Interpretation Alternatives I to IV**



Consolidated Cost Estimates

Alternatives I to IV for Fortress Rosecarans, Murfreesboro, Tennessee

ALTERNATIVE I

Interpretation	\$ 4,000
Design	0
Vegetation Management	0
Maintenance/Protection and Interpretation	<u>14,900*</u>
TOTAL	\$ 18,900

ALTERNATIVE II

Interpretation	\$ 46,700
Design Elements	227,575
Vegetation Management	70,000**
Maintenance/Protection & Interpretation	<u>51,600*</u>
TOTAL	\$395,875

ALTERNATIVE III

Interpretation	\$ 60,225
Design Elements	382,000
Vegetation Management	70,000
Maintenance/Protection & Interpretation	<u>91,400*</u>
TOTAL	\$603,625

ALTERNATIVE IV

Interpretation	\$ 78,000
Design Elements	513,000
Vegetation Management	70,000
Maintenance/Protection & Interpretation	<u>116,500*</u>
TOTAL	\$777,500

\*Represents first year costs for personnel and benefits as listed in main portion of the plan.

\*\*Cost estimates for Vegetation Management and Preservation will be between \$68,000 and \$78,000 (See Appendix A). This is a general estimate.

**A detailed breakdown of the above cost estimates is on the pages following.**

Fortress Rosecrans Interpretive Media Estimates  
All estimates include planning, production, and equipment.

ALTERNATIVE I - NO ACTION

Rehab Sign	<u>\$ 4,000</u>
TOTAL:	\$ 4,000

ALTERNATIVE II - MINIMAL ACTION

No Action package	\$ 4,000
Orientation Wayside	8,000
Lunette Palmer view	3,675
Lunette function/artillery	3,675
Curtain #2 traverses/firing steps	3,675
Lunette Thomas a natural place	3,675
1/3 Cost Unigrid folder revision STRI/FORO	<u>20,000</u>
TOTAL:	<u>\$46,700</u>

ALTERNATIVE III - MODERATE DEVELOPMENT

Minimal Development package	\$46,700
Artillery Magazine wayside	3,675
Infantry	3,675
Curtain #2 exterior	3,675
Site, bulletin supplement	<u>2,500</u>
TOTAL:	\$60,225

ALTERNATIVE IV - FULL DEVELOPMENT

Moderate Development package	\$60,225
Lunette Thomas vegetation wayside	3,675
Lunette Thomas wildlife	3,675
Lunette Thomas resource management	3,675
Audiostation add-on Lunette Palmer	2,500
Audiostation add-on Curtain #2	2,500
Audiostation add-on Lunette Thomas	<u>2,500</u>
TOTAL:	<u>\$78,000</u>

**FORTRESS ROSECRANS  
Murfreesboro, TN**

**COST ESTIMATE ALTERNATIVE II (design elements)**

BENCHES 800.00 ea. x 6 benches =	4,800.00
CURBING 24.00/lin. ft. x 1130 lin feet =	27,120.00
SIDEWALK 50.00/sq. yd. x 300 sq. yds. =	15,000.00
TREES 250.00 ea. x 18 trees =	4,500.00
SHRUBS 75.00 ea. x 58 shrubs =	4,350.00
DIRECTIONAL SIGN 200.00 ea. x 2 =	400.00
TRAIL (surface 6' wide) 42,000/mile x 2000 feet =	16,000.00
BOARDWALK (on grade) 9.00/sq. ft.	
BOARDWALK (elevated) 32.00/sq. ft. x 400 lin. ft. (6')	76,800.00
HANDRAILS (wooden) 18.00/lin. ft. x 800 lin. ft. =	14,400.00
PARKING AREA (paved) 1400.00/car x 23 cars =	32,200.00
(parking = 16,000 sq. ft.) 4500.00/bus x 2 buses =	9,000.00
DRINKING FOUNTAIN 2500.00 ea. x 1 fountain =	2,500.00
ENTRANCE SIGN (small) 5000.00 ea. x 1 sign =	5,000.00
TRASH RECEPTACLES (375.00) ea. x 3 =	1,125.00
WAYSIDES ON BOARDWALK	
(design A) 253 sq ft x 40.00/sq ft x none	
(design B) 212 sq ft x 40.00/sq ft x 1 wayside	8,480.00
(design C) 290 sq ft x 40.00/sq ft x 1 wayside	11,600.00
WAYSIDES ON TRAIL = 3 x 500.00 =	1,500.00

**TOTAL.....\$ 227,575.00**

**COST ESTIMATE ALTERNATIVE III (design elements)**

BENCHES 800.00 ea. x 8 benches =	6,400.00
CURBING 24.00/lin. ft. x 1130 lin feet =	27,120.00
SIDEWALK 50.00/sq. yd. x 300 sq. yds. =	15,000.00
TREES 250.00 ea. x 18 trees =	4,500.00
SHRUBS 75.00 ea. x 58 shrubs =	4,350.00
DIRECTIONAL SIGN 200.00 ea. x 2 =	400.00
TRAIL (surface 6' wide) 42,000/mile x 2000 feet	16,000.00
BOARDWALK (on grade) 9.00/sq. ft.	
BOARDWALK (elevated) 32.00/sq. ft. x 1000 lin ft (6')	192,000.00
HANDRAILS (wooden) 18.00/lin. ft. x 2000 lin. ft.	36,000.00
PARKING AREA (paved) 1400.00/car x 23 cars =	32,200.00
(parking = 16,000 sq. ft.) 4500.00/bus x 2 buses =	9,000.00
DRINKING FOUNTAIN 2500.00 ea. x 1 fountain =	2,500.00
ENTRANCE SIGN (small) 5000.00 ea. x 1 sign =	5,000.00
TRASH RECEPTACLES (375.00) ea. x 3 =	1,125.00
WAYSIDES ON BOARDWALK	
(design A) 253 sq ft x 40.00/sq ft x 1 wayside	10,120.00
(design B) 212 sq ft x 40.00/sq ft x 2 waysides	16,960.00
(design C) 290 sq ft x 40.00/sq ft x none	
WAYSIDES ON TRAIL = 5 x 500.00 =	2,500.00
WAYSIDE AT BATHROOMS = 1 x 1,000.00 =	1,000.00

**TOTAL.....\$ 382,175.00**

**COST ESTIMATE ALTERNATIVE IV (design elements)**

BENCHES	800.00 ea. x 10 benches =	8,000.00
CURBING	24.00/lin. ft. x 1130 lin feet =	27,120.00
SIDEWALK	50.00/sq. yd. x 300 sq. yds. =	15,000.00
TREES	250.00 ea. x 18 trees =	4,500.00
SHRUBS	75.00 ea. x 58 shrubs =	4,350.00
DIRECTIONAL SIGN	200.00 ea. x 2 =	400.00
TRAIL (surface 6' wide)	42,000/mile x 2,500 feet	20,000.00
BOARDWALK (on grade)	9.00/sq. ft.	
BOARDWALK (elevated)	32.00/sq. ft. x 1,500 lin ft 6'	288,000.00
HANDRAILS (wooden)	18.00/lin. ft. x 3,000 feet	54,000.00
PARKING AREA (paved)	1400.00/car x 23 cars =	32,200.00
	(parking = 16,000 sq. ft.) 4500.00/bus x 2 buses =	9,000.00
DRINKING FOUNTAIN	2500.00 ea. x 1 fountain =	2,500.00
ENTRANCE SIGN (small)	5000.00 ea. x 2 =	5,000.00
TRASH RECEPTACLES (375.00)	ea. x 3 =	1,125.00
WAYSIDES ON BOARDWALK		
	(design A) 253 sq ft x 40.00/sq ft x 2 waysides	20,240.00
	(design B) 212 sq ft x 40.00/sq ft x 2 waysides	16,960.00
	(design C) 290 sq ft x 40.00/sq ft x none	
WAYSIDES ON TRAIL	= 7 x 500.00 =	3,500.00
WAYSIDE AT BATHROOM	= 1 x 1,000.00 =	1,000.00

**TOTAL.....\$ 512,895.00**



## **Planning Team Members**

### **Southeast Regional Office**

Team Captain - Len Brown, Regional Historian

John Beck, Interpretive Specialist

Doug Madsen, Landscape Architect

### **Stones River National Battlefield**

Mary Ann Peckham, Superintendent

Charles Spearman, Park Historian

Bob Simerly, Chief of Maintenance

### **Cumberland Gap National Historical Park**

Dan Brown, Park Historian

Jack Collier, Chief Resource Management

### **City of Murfreesboro, Tennessee**

Dennis Rainier, Director, Parks and Recreation Department

