# 3. INITIAL SCREENING

This section presents the method, criteria, results, and recommendations from the initial screening process for the ATFS. It begins with a general description of baseline resources in the park, including cultural and natural resources. A summary of the project goals and objectives, developed by the study team with the National Park Service, was then presented, as well as a description of how these goals and objectives were used to derive and establish the initial screening criteria. This is followed by descriptions of the initial screening process and results, which identify "fatal flaws" by assigning "pass," "neutral," or "fail" ratings to the initial options. The last subsection presents the recommended options to be carried forward. The initial screening criteria and results are summarized in Table 3-2. The options which passed the initial screening and are recommended for further developments are presented in Table 3-3.

# 3.1 BASELINE RESOURCES INFORMATION

Assessment of the transportation options in the park is enhanced with a consideration of impacts on the extant cultural and natural resources. Cultural resources are defined as the "collective evidence of the past activities and accomplishments of people. Buildings, objects, features, locations, and structures with scientific, historic, and cultural value are all examples of cultural resources. Cultural resources are finite and non-renewable resources that once destroyed cannot be returned to their original state."<sup>7</sup> Such resources can be determinate and confined to a limited geographic area (e.g., a "site"), or they can be expansive and cover a larger area (e.g., a "cultural landscape"). The Custer and Reno-Benteen Battlefields fit the definition of a *cultural landscape*, as relatively large areas where significant events occurred (in this case, a short span of time), which left behind physical evidence of those events.<sup>8</sup> In contrast, a *site* is more spatially limited and representative of perhaps a single activity, such as Last Stand Hill, where General Custer and his soldiers fought and died. In contrast, natural resources are more encompassing, including "any material from nature having potential economic value or providing for the sustenance of life, such as timber, minerals, oil, water and wildlife," but could also be defined as "environmental features that serve a community's wellbeing."<sup>9</sup>

# **Cultural Resources**

On June 25-26, 1876, two cultures clashed on the bluffs above the Little Bighorn River in southcentral Montana. The Battle of the Little Bighorn (or, to the Indian tribes who participated, the Battle of the Greasy Grass) was an armed engagement between combined forces of Lakota, Northern Cheyenne, and Arapaho people against the 7<sup>th</sup> Cavalry Regiment of the U.S. Cavalry, under the command of General George Armstrong Custer. Custer and his men fought and died at what is now called Custer Battlefield within the park boundaries, while his subordinates, Major Marcus Reno and Captain Frederick Benteen, established a defensive position at what is now known as the Reno-Benteen Battlefield. The battle became a rallying point for the military's subjugation of Native Americans in the West and an icon in American culture. Over the years, the events that actually occurred at the Battle of Little Bighorn became shrouded in legend, making it difficult to separate

 New York State Museum, "Frequently Asked Questions about Cultural Resources." Electronic document, http://www.nysm.nysed.gov/research/anthropology/crsp/crm\_faq.html, accessed August 21, 2012.
National Park Service, "Guidelines for Treatment of Cultural Landscapes." Electronic document,

http://www.nps.gov/tps/standards/four-treatments/landscape-guidelines/terminology.htm, accessed August 21, 2012.
Black's Law Dictionary, 7<sup>th</sup> Edition, 1999, West Publishing Company, St. Paul, Minnesota.

fact from fiction. Beginning in 1958, archaeological investigations conducted within the park boundaries have confirmed the locations of such positions as the defense perimeter, the field hospital location, individual rifle pits, and battle-related artifacts.<sup>10</sup> The partial remains of several soldiers have also been recovered. The data produced from the archaeological surveys have revealed new information about troop and warrior positions and even glimpses of the course of the battle itself.

The Custer Battlefield, Reno-Benteen Battlefield and ridges between these areas, the Indian village site, and the primary viewshed surrounding the monument are all important elements associated with the Battlefield cultural landscape. Many of the surrounding lands also contain artifacts and sites related to the battle. Several Indian tribes participated in the battle, including the Northern Cheyenne, Lakota, Arapaho, Arikara, and Crow. The modern descendants of those tribes who participated in the battle have come to view the conflict as a uniquely important event that helped to bolster Indian pride in the face of continuous efforts to remove them from their homelands. Unfortunately, little is known of these contemporary Indian interpretations of the site and the event itself.

## Natural Resources

The battlefield is located along the banks of the Little Bighorn River in a northern high plains environment. Natural resources at the battlefield are heavily influenced by climate and topography.<sup>11</sup> Moderate precipitation with abundant sunshine, low relative humidity, and clay soils combine to produce a suitable environment for middle to tall grass prairies. Soils range from deep to very shallow, and from clay to loamy fine sands. The features, such as steepness of slope, are more decisive in determining land classification and range sites than are the soil characteristics. The lower slopes have deep soils, which are prone to both wind and water erosion. Two vegetation community types found in Little Bighorn are the Northern Mixed Grass Prairie with sections of sagebrushdominated shrub steppe. Cottonwood and sedge riparian areas exist along the Little Bighorn River. Mixed-grass prairie is typically dominated by Bluebunch wheatgrass, which makes up about onethird of the vegetation at Little Bighorn. Presently, Bouteloua-Stipa-Agropyron is the dominant cover type on the battlefield. Other grasses include Idaho fescue, western wheatgrass, green needlegrass, prairie junegrass, and blue grama. The main shrubs are hawthorn, chokeberry, silver sage and big sagebrush. Cottonwood trees are prominent in areas along the Little Bighorn River, very little of which lies within the present monument boundary. Native willows appear to have declined since the time of the Battle. Mammals such as whitetail deer, cottontail rabbits, porcupines, skunks, coyotes, and foxes are represented in the monument. A growing village of prairie dogs lies approximately a thousand yards outside the northwest boundary of the Custer Battlefield. Rattlesnakes and bull snakes represent most of the reptile population. Birds frequently seen within the monument are western meadowlarks, robins, sparrows, sharp tail grouse, and magpies.

<sup>10.</sup> National Park Service, "Little Bighorn Battlefield National Monument Resources Management Plan," 2007. 11. New York State Museum, "Frequently Asked Questions About Cultural Resources." Electronic document, http://www.nysm.nysed.gov/research/anthropology/crsp/crm\_faq.html, accessed August 21, 2012.

# 3.2 CRITERIA FOR INITIAL SCREENING

One of the important outcomes of the kickoff workshop was the agreement between the National Park Service and the study team that the ATFS would use a two-step screening process to evaluate, compare, and refine transportation options. The first level, referred to as initial screening, was intended to identify "fatal flaws" by ratingeach initial option using a "pass," "neutral," or "fail" system, based on a set of criteria. These "fatal flaw" ratings represent critical flaws of each option that would be reason to not carry it forward for more detailed development and evaluation. As described in later sections of this report, the second step occurred following NPS' review and discussion of the initial screening results and involved a more detailed screening of the options that passed the initial screening. The detailed screening not only evaluated each option that passed the initial screening criteria built upon the initial screening criteria but also incorporated additional parameters for financial feasibility, park management, general impacts on cultural and natural resources, general impacts on visitor experience, and other considerations.

The study team derived initial screening criteria from the project goals and objectives that were developed during the Kickoff Workshop, with the following considerations:

- Criteria collectively should assess whether an option would be able to help fulfill the park mission, which is presented in the following subsection.
- Criteria need to be consistent with established goals and objectives resulting from the Kickoff Workshop, while avoid looking into detailed performance measures, which will be the focus of detailed screening.
- Criteria should balance short-term and long-term transportation needs. Although some goals and objectives target short-term improvements more than others, each criterion needs to avoid focusing only on short-term or long-term improvements and impacts.
- Criteria should be applied to evaluate each option's effectiveness in solving the critical transportation issues summarized in the Existing Conditions memorandum (Appendix A) and identified through previous planning and study efforts for the park.

## Park Mission

The following park mission statement describes conditions that exist when the legislative intent for the park is being met:

"Little Bighorn Battlefield National Monument preserves, protects, and interprets the historic, cultural, and natural resources, including lands, pertaining to the Battle of the Little Bighorn, leaving them unimpaired, and provide visitors with an understanding of the historic events leading up to the battle, the encounter itself, and the consequences by both the military and American Indian contingents, for the enjoyment of future generations." <sup>12</sup>

<sup>12.</sup> Preliminary Feasibility Study – Alternative Transportation (**Draft**). Little Bighorn Battlefield National Monument, National Park Service - Denver Service Center, and National Park Service – Intermountain Region; February 2010.

# **Project Goals and Objectives**

The draft goals and objectives developed in the kickoff workshop were subsequently reviewed and reorganized by the study team and are presented below.

#### Goal #1: Reduce operation and management requirements through asset management

- Reduce impacts on pavement shoulders, adjacent facilities, and resources
- Contribute to sustainable maintenance practices and funding
- Ensure that new construction projects are sustainable
- Identify both short-term (easier) and long-term projects

#### Goal #2: Exercise management practices to solve short-term transportation problems

- Improve signs and information ("way-finding")
- "Manage" way out instead of "building" a way out
- Rework patterns within existing paved footprint
- Better manage existing visitor parking inventory
- Rework RV circulation and parking
- Use combination of incentives and enforcement to implement new management practices

# Goal #3: Develop transportation alternatives that protect resource values and enhance visitor experience

- Reduce noise impacts and air emissions
- Protect resources by limiting expansion of parking and vehicle "footprint"
- Recognize a continuum of resource significance at the park
- Examine appropriate technical alternative transportation system options
- Reduce parking frustration for visitors
- Improve "waysides" experience
- Consider ITS applications
- Use trip planning and the park website as a tool
- Improve visitor safety

## Goal #4: Recognize opportunities to improve public and community support

- Encourage public and community input and communication
- Engage in identifying and evaluating solutions
- Consider options outside the park boundaries
- Utilize and enhance local concession capability

Given the goals and objectives articulated at the Kickoff Workshop, the study team set forth the following criteria for screening the initial set of transportation options:

- A. Enhance visitor experience
- B. Minimize impacts to historical, cultural, and natural resources
- C. Reduce traffic congestion and parking shortage in the park
- D. Manage transportation assets to maintain acceptable conditions
- E. Improve visitor safety

The matrix in Table 3-1 shows the relationship between the goals and objectives and the initial screening criteria. In several cases, specific objectives are addressed by two or more criteria. Similarly, each criterion addressed multiple goals and objectives.

	Initial Screening Criteria				
	А	В	с	D	Е
Goals and Objectives	Enhance visitor experience	Minimize impacts to historical, cultural, and natural resources	Reduce traffic congestion and parking shortage in the park	Manage transportation assets to maintain acceptable conditions	lmprove visitor safety

## Table 3-1: Relationship between Goals/Objectives and Initial Screening Criteria

#### Goal #1: Reduce Operation and Management requirements through asset management

Reduce impacts on pavement shoulders, adjacent facilities, and resources			
Contribute to sustainable maintenance practices and funding			
Ensure that new construction projects are sustainable			
Identify both short-term (easier) and long-term projects			

#### Goal #2: Exercise management practices to solve short-term transportation problems

Improve signs and information ("way-finding")			
"Manage" way out instead of "building" way out			
Rework patterns within existing paved footprint			
Better manage existing visitor parking inventory			
Rework RV circulation and parking			
Use combination of incentives and enforcement to implement new management practices			

	Initial Screening Criteria				
	А	В	С	D	Е
Goals	Enhance visitor experience	Minimize impacts to historical, cultural, and natural resources	Reduce traffic congestion and parking shortage in the park	Manage transportation assets to maintain acceptable conditions	lmprove visitor safety
Goal #3: Develop transportation alternatives that	t protect natura	al and cultural ı	resources and er	hance the visitor ex	perience
Reduce noise impacts and air emissions					
Protect resources by limiting expansion of parking and vehicle "footprint"					
Recognize a continuum of resource significance at the park					
Examine appropriate technical alternative transportation system options					
Reduce parking frustrations for visitors					
Improve "waysides" experience					
Consider Intelligent Transportation Systems (ITS) applications					
Use trip planning and the park website as a tool					
Improve visitor safety					

## Table 3-1: Relationship between Goals/Objectives and Initial Screening Criteria, continued

#### Goal #4: Recognize opportunities to improve public and community support

Encourage publicand community input and communication			
Engage public and community in identifying and evaluating solutions			
Consider options outside the park boundaries			
Utilize and enhance local concession capability			

Source: URS Corporation.

The application of these criteria to evaluate the initial transportation options is presented in Table 3-2 and explained in the following subsection.

# 3.3 SCREENING RESULTS

This subsection presents the initial screening results for each of the 13 initial transportation options. The results of the screening are summarized in Table 3-2 and discussion which follows. It should be noted that the letters "A" through "E" assigned to each criterion are only for identification purposes and do not denote significance or importance of criteria.

Three of the construction options, including Option 1 - Repairing Tour Road and Reconfiguring Parking Lots; Option 2 - Widening Tour Road and Expanding Parking Lots (4R Project), and Option 3 - One-way Loop via I-90 Frontage Road (the GMP Option) passed the initial screening. Each of these three options is rated as "pass" or "neutral" against all initial screening criteria. It should be noted that the 4R Project and GMP Option were initially rated as "fail" against the criterion "minimize impacts to historical, cultural, and natural resources." However, prior to this study, both options were cleared for environmental compliance. As a result of the environmental clearance, their affects/impacts on park resources can be avoided, minimized, or mitigated. Therefore their rating was adjusted to "neutral" against the resource impact criterion.

In the no-build category, one of the three options, Option 7 - Management Improvements and Parking Reconfiguration, is rated as "pass" or "neutral" against all initial screening criteria, and therefore is considered as passing the initial screening. The other two no-build options are each rated "fail" against at least one criterion.

In the transit category, one of the four options, Option 10 - Voluntary Transit for All Visitors, is rated as "pass" or "neutral" against all initial screening criteria, and therefore is considered as passing the initial screening. The other three transit options are each rated "fail" against at least one criterion.

General discussions of evaluating the 13 options against each criterion (the initial screening process) are presented in the following paragraphs, organized by the initial options in the same order as in Table 3-2. The numbered item labels A, B, C, D, and E under each option represent the initial screening criteria, similar to the column headers in Table 3-2. The parenthesized word "(Pass)", "(Neutral)", or "(Fail)" following each letter label is the rating against the corresponding criterion. Reasoning for the rating is presented in each numbered item.

#### Table 3-2: Initial Screening Matrix

	Initial Screening Criteria				
	Α	В	С	D	E
Initial Set of Options CONSTRUCTION OPTIONS	Enhance visitor experience	Minimize impacts to historical, cultural, and natural resources	Reduce traffic congestion and parking shortage in the park	Manage transportation assets to maintain acceptable conditions	Improve visitor safety
1) Repair Tour Road and Reconfigure Parking	Pass	Neutral	Neutral	Pass	Neutral
A Widen Road and Expand Existing Parking Lots (4R Project)	Pass	Neutral	Pass	Neutral	Pass
3) One-Way Loop via I-90 Frontage Road (GMP Option)	Pass	Neutral	Pass	Neutral	Pass
4) One-Way Loop via U.S. 212	Pass	Fail	Pass	Neutral	Pass
5) Detached Multiuse Trail Paralleling the Tour Road	Pass	Fail	Fail	Fail	Neutral
6) Alternate Infrastructure Improvements	Pass	Fail	Neutral	Pass	Neutral
NO-BUILD OPTIONS				I	
7) Management Improvements and Parking Reconfiguration	Pass	Neutral	Pass	Neutral	Neutral
8) Seasonal Reservation/ Permit System	Fail	Neutral	Pass	Neutral	Neutral
9) Permanently Close Road to Motorized Vehicles and Maintain it as a Trail	Fail	Pass	Fail	Neutral	Neutral
TRANSIT OPTIONS					
10 Voluntary Transit for All Visitors	Pass	Pass	Neutral	Neutral	Pass
11) Mandatory Peak/Seasonal/Special Events Transit for All Visitors with Motorized Vehicles	Fail	Pass	Neutral	Neutral	Pass
12) Mandatory Transit for Visitors with Oversized Vehicles	Fail	Pass	Neutral	Neutral	Pass
13) Mandatory Year-round Transit for All Visitors with Motorized Vehicles	Fail	Pass	Pass	Fail	Pass

Source: URS Corporation.

## 1) Repair Tour Road and Reconfigure Parking

This construction option passed or was neutral against all five evaluation criteria:

- A. (Pass) Minor widening of the road to a consistent 20-foot pavement width and more efficient parking would make the park easier to visit, improve traffic and parking conditions, better accommodate oversized vehicles, reduce visitor frustration at the parking lots and on the tour road, and therefore enhance visitor experience.
- B. (Neutral) Minor widening of the tour road would increase roadway footprints and may impact cultural and natural resources; however, reduced congestion and conflicts because of a wider road and more efficient parking patterns would mitigate current impacts by visitor activities.
- C. (Neutral) The slightly wider road with strengthened roadbed, aggregate, and pavement and more efficient parking configuration would provide effective relief to traffic congestion and parking shortage in the short term. Long-term traffic and parking benefits could diminish if visitor volumes grow substantially in the future.
- D. (Pass) Repairing the tour road could address deferred maintenance, making asset management more sustainable due to stabilized and strengthened roadway and parking infrastructure. In addition, total pavement would only slightly increase due to minor widening of the road, which is not expected to incur significantly higher costs for asset management.
- E. (Neutral) Although the improved tour road and more efficient parking configuration would reduce vehicle related conflicts and improve visitor safety, the extent of safety benefits are limited and could diminish if visitor volumes grow substantially in the future.

As a result, this option was carried forward to the next step of the study for further refinement and evaluation.

## 2) Widen Road and Expand Existing Parking Lots (4R Project)

This construction option passed or was neutral against all five evaluation criteria:

- A. (Pass) Widening the road from 18-feet to 24-feet and increasing parking spaces would make the park easier to visit, improve traffic and parking conditions, better accommodate oversized vehicles, reduce visitor frustration at the parking lots and on the tour road, and therefore enhance visitor experience.
- B. (Neutral) Construction would increase roadway and parking footprints, and therefore impact park resources; however, reduced congestion and conflicts because of a wider road and more parking spaces would mitigate current impacts by visitor activities. Furthermore, an Environmental Assessment (EA) was completed and consequently a Finding of No Significant Impacts (FONSI) was issued for this 4R project. Therefore, resource impacts by this 4R project can be avoided, minimized, or mitigated.
- C. (Pass) The wider road with strengthened roadbed, aggregate, and pavement; increased parking; and more efficient parking configuration would provide effective relief to traffic congestion and parking shortage.
- D. (Neutral) The 4R project or construction projects of a similar scope could address deferred maintenance, making asset management more sustainable due to stabilized and strengthened roadway and parking infrastructure. On the other hand, total pavement would significantly increase, which would incur higher costs for asset management.

E. (Pass) Improving road and parking infrastructure, as the 4R project is aimed at, is likely to reduce the number and severity of conflicts in the park.

As a result, this option was carried forward to the next step of the study for further refinement and evaluation.

### 3) One-Way Loop via I-90 Frontage Road (GMP Option)

The GMP option passed or was neutral against all five evaluation criteria:

- A. (Pass) The one-way loop would enhance visitor experience by providing a more pleasant drive, significantly reducing traffic conflicts, presenting the waysides in a correct chronological order of the Battle, and allowing visitors to start their experience in the Little Bighorn Valley/Reno Skirmish Line.
- B. (Neutral) Expanding the paved footprint could impact cultural and natural resources, a change that would be very difficult, if possible, to mitigate to the satisfaction of all stakeholders. However, in 1985 an EA was completed that disclosed the potential environmental consequences of implementing this option as well as other GMP elements. As a result, resource impacts by the GMP option can be avoided, minimized, or mitigated.
- C. (Pass) The one-way road, combined with additional (offsite) parking facility and a transit service, is expected to effectively relieve congestions and parking shortage in the park.
- D. (Neutral) A one-way loop could reduce vehicle trips in the park by half (in terms of one-way trips) and contribute to better asset management. However, significantly increased pavement, new road segments in a hilly terrain, and a new bridge would incur high costs for maintenance.
- E. (Pass) The one-way loop road coupled with increased (offsite) parking would effectively reduce the number and severity of conflicts, providing a safer transportation system for all visitors.

This option is the preferred alternative in the GMP, and is still considered as the long-term improvement plan for the park. However, due to its high costs and resource impacts, this option is not anticipated to be implemented in the foreseeable future.

As a result of the initial screening, this option was carried forward to the next step of the study for further refinement and evaluation.

## 4) One-Way Loop via U.S. 212

The fourth construction option is similar to Option 3 but follows a different alignment. It failed one criterion and was neutral on or passed the others:

- A. (Pass) The clockwise one-way loop would enhance visitor experience by providing a more pleasant drive, removing the need for vehicles to pass each other, and presenting the waysides in a correct chronological order.
- B. (Fail) This option would require construction of a one-way road from Reno-Benteen Battlefield north to U.S. 212, a new road of approximately 3.5 to 4.5 miles long that runs through the sensitive battlefield landscape in a hilly terrain. This significant expansion of the paved footprint would significantly impact cultural and natural resources, and some of those impacts might not be possible to mitigate in a way that satisfies all stakeholders.
- C. (Pass) The one-way road coupled with additional (offsite) parking facility is expected to effectively relieve congestions and parking shortage in the park.

- D. (Neutral) A one-way loop could reduce vehicle trips in the park by half (in terms of one-way trips within park boundaries) and contribute to better asset management. However, it would not eliminate oversized vehicles which contribute to pavement deterioration. Furthermore, significantly increased pavement, signing, drainage associated with the new one-way road would incur higher costs for maintenance.
- E. (Pass) The one-way loop road as well as increased (offsite) parking would effectively reduce the number and severity of conflicts, providing a safer transportation system for all visitors.

Compared with Option 3, this one-way loop may not require a bridge, but would have a significantly longer new road to connect Reno-Benteen to U.S. Highway 212.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

#### 5) Detached Multi-use Trail Paralleling Tour Road

The fifth construction option failed three evaluation criteria and was neutral on or passed the others:

- A. (Pass) A detached trail would enhance visitor experience by providing non-motorized travel modes, including pedestrians and bicyclists, safe access parallel to yet separate from the tour road.
- B. (Fail) New construction required for a detached trail would impact natural and cultural resources and would be difficult to mitigate.
- C. (Fail) A multi-use trail would not be able to mitigate parking shortage in the visitor center area, nor is it expected to significantly reduce the number of motorized vehicles on the tour road.

Most visitors to the park come off I-90 on their way to elsewhere, and their stay in the park is typically no more than a couple of hours. Therefore a multi-use trail is unlikely to attract a significant number of visitors out of their automobiles to take a bike ride or walk along the tour road.

- D. (Fail) The detached trail would not be able to relieve the vehicle loads on the tour road and parking lots, but would incur higher costs for maintenance.
- E. (Neutral) Though it is expected to improve pedestrian and bicyclist safety along the tour road, it would not be able to reduce conflicts in the parking areas or on the tour road involving oversized vehicles.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

#### 6) Alternate Infrastructure Improvements

The sixth construction option failed one criterion and passed or was neutral on others:

- A. (Pass) In the short-term, this option would improve traffic circulations on the tour road and provide more efficient parking in the park, thus enhancing visitor experience. Due to the moderate improvements to roadway and parking infrastructure, visitor experience may be diminished in the future if the number of visitors increase significantly.
- B. (Fail) Additional turn-around areas and pullouts would increase the paved footprint, although to much less extent compared with other major construction options, such as Option 4. Parking expansion to better accommodate oversized vehicles would impact the visual landscape immediately adjacent to the entrance station. Cultural and natural resource impacts could be difficult to mitigate.

- C. (Neutral) This option is expected to moderately relieve parking congestion, but not traffic congestion in the other areas, in particular on the tour road involving oversized vehicles.
- D. (Pass) A comprehensive program of alternative structural improvements could address deferred maintenance.
- E. (Neutral) The safety benefit from this option is considered marginal, if any, for visitors on the tour road.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

## 7) Management Improvements

This no-build option, limited to management improvements only, is a relatively low-cost and lowimpact approach to improving transportation at the park. It passed or was neutral in all the categories.

- A. (Pass) This option would moderately improve visitor experience in the short-term by providing clear and updated information, wayfinding guidance, more efficient parking (in particular for oversized vehicles), etc. However, visitor experience is not expected to change significantly, and these benefits would diminish if visitor volumes grow significantly in the future.
- B. (Neutral) Current visitor impacts to cultural and natural resources are not expected to change substantially, i.e., this option would not be able to reduce resource impacts.
- C. (Pass) It is expected to moderately relieve parking congestion at the visitor center area, but not traffic congestion in the other areas, in particular involving oversized vehicles on the tour road.
- D. (Neutral) This option would not substantially affect asset conditions.
- E. (Neutral) Since it does not address the narrow tour road with outdated pavement design, this option would not be able to improve visitor safety on the tour road; however, it could improve safety in the parking lot at the visitor center.

As a result of the initial screening, this option was carried forward to the next step of the study for further refinement and evaluation.

## 8) Seasonal Reservation/ Permit System

A second no-build option to manage visitation through a reservation/permit system is relatively unfavorable; it failed one criterion and passed or was neutral on the remaining criteria:

- A. (Fail) Although the experience of some visitors would be enhanced due to better visitor demand management, others might be discouraged if they come to the park and are denied access because they did not obtain a permit in advance. In particular, the park is considered as an intermediate, even impromptu, stop by many visitors on their way to somewhere else via I-90, and these visitors typically are unlikely to make reservations to the park in advance. Therefore, a reservation/permit system could have an overall negative impact on visitor experience and discourage many visitors from coming to the park.
- B. (Neutral) Cultural and natural resource impacts are unlikely to change substantially with implementation of this option, although moderate mitigation may be expected due to reduced congestion at parking lots and on the tour road.

- C. (Pass) It is expected to reduce traffic congestion on the tour road by better managing visitor distribution, in particular during the peak periods.
- D. (Neutral) Although this option may help reduce the intensity of vehicle loads on the pavement, it is not expected to substantially improve asset conditions or ease asset management.
- E. (Neutral) This option could improve visitor safety on the narrow tour road by reducing congestion, but the safety benefit would be marginal since the narrow tour road is not improved. Furthermore, the congestion would be shifted to the visitor center parking lots (if a permit is only required to drive on the tour road, not at the visitor center parking lots), where there would be increased potential for conflicts.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

#### 9) Permanently Close Road to Motorized Vehicles and Maintain It as a Trail

The third no-build option is a more aggressive approach to managing visitation and relieving vehicle congestion by permanently closing the tour road. As described below, it failed in two categories and passed or was neutral on the others:

- A. (Fail) It could discourage many visitors from venturing any farther than Last Stand Hill because motorized vehicles would not be allowed. Most of the visitors to the park come off I-90 for a relatively short stop, while on their way to somewhere else. Many of them may simply give up the idea of visiting the park once they learn that the tour road is closed to motorized vehicles.
- B. (Pass) Reduced visitor use, in particular elimination of motorized vehicle use on the tour road, would have a positive impact on cultural and natural resources.
- C. (Fail) Although it would prevent the tour road from having congestion, most cars might stay longer in the visitor center area, aggravating conflicts, congestion, and parking shortage in this area.
- D. (Neutral) Although this option would benefit management of the tour road, the visitor center area is expected to be more difficult to manage and maintain.
- E. (Neutral) It would improve safety on the tour road, but deteriorate safety conditions in the visitor center area.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

## 10) Voluntary Transit for All Visitors

The first transit option takes a voluntary approach and passed or was neutral in all categories:

- A. (Pass) Visitor experience would be enhanced by reducing congestion and including interpretation with transit or tour operations. Visitors can choose between riding the transit vehicles or drive their own vehicle to tour through the battlefield.
- B. (Pass) Cultural and natural resources would be better protected with a reduced number of cars on the tour road.
- C. (Pass) With appropriate passenger incentive and offsite parking, this option would effectively reduce congestion and parking shortage.

- D. (Neutral) Transit would facilitate better asset management and enhance park sustainability by reducing private motorized vehicles in the park or on the tour road; however, this option may not be very effective in reducing oversized vehicles in the park. Furthermore, it requires substantial staffing resources to manage the contract with a concessioner to provide the transit service.
- E. (Pass) It would offer safety benefits to passengers who would otherwise have to drive their own cars on the narrow tour road.

As a result of the initial screening, this option was carried forward to the next step of the study for further refinement and evaluation.

#### 11) Mandatory Peak/Seasonal/Special Events Transit

This mandatory peak transit option is presented as part of a suite of mandatory transit options (11, 12, and 13). It failed in one category and passed or was neutral in other categories:

- A. (Fail) For visitors who would prefer transit rather than driving their own vehicles, their experience would be enhanced by reduced or eliminated congestion and the ability to include interpretation with transit or tour operations. However, most of the visitors to the park come off I-90 for a relatively short stop, while on their way to somewhere else. Many of them would be discouraged from visiting the park once they learn that they have to leave their vehicles at an off- or on-site parking lot and take transit to the tour road.
- B. (Pass) It would minimize visitor impacts on cultural and natural resources by significantly reducing the number of vehicles on the tour road and in the visitor center area (with offsite parking).
- C. (Neutral) With offsite parking, this option is expected to significantly reduce or eliminate traffic congestion on the tour road and in the visitor center area. If offsite parking cannot be provided, it could substantially aggravate parking shortage in the visitor center area.
- D. (Neutral) Transit would facilitate better asset management by reducing the number of vehicles on the tour road during peak periods. If offsite parking cannot be provided, it could substantially aggravate parking congestion in the visitor center area and make it more difficult to manage assets in this area.
- E. (Pass) It would offer significant safety benefits by reducing vehicular volumes in the park.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

#### 12) Mandatory Peak/Seasonal/Special Events Transit for Visitors with Oversized Vehicles

This mandatory transit option would require oversized vehicle users to take the transit. Visitors with regular size vehicles would be able to choose between using their own vehicles or take the transit. Similar to option #11, this option failed in one category and passed or was neutral in other categories:

A. (Fail) For visitors who would prefer transit rather than driving their own vehicles, their experience would be enhanced by reduced congestion and the ability to include interpretation with transit or tour operations. However, most of the visitors to the park come off I-90 for a relatively short stop, while on their way to somewhere else. Due to the "passerby" nature of their trips to the park, many oversized vehicle users would perceive it as very inconvenient that they have to leave their vehicles at an off- or on-site parking lot and take transit to the tour road.

- B. (Pass) Cultural and natural resources would be better protected due to significant reduction of oversized vehicles on the tour road, since in recent years up to 25% of vehicles entering the park are oversized vehicles.
- C. (Neutral) Traffic congestion on the tour road is expected to be reduced due to significantly fewer oversized vehicles. However, if sufficient offsite parking cannot be provided, parking shortage at the visitor center area could be aggravated.
- D. (Neutral) This transit option would facilitate better asset management by restricting oversized vehicles on the tour road during peak periods. If offsite parking cannot be provided, it could aggravate parking congestion, in particular for oversized vehicles, in the visitor center area and make it more difficult to manage assets in this area.
- E. (Pass) Visitor safety would be improved due to the restriction of oversized vehicles on the tour road during peak periods.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

#### 13) Mandatory Year-round Transit for All Visitors with Motorized Vehicles

This is the most aggressive transit option being evaluated. It failed in two categories and passed others:

- A. (Fail) For visitors who would prefer transit rather than driving their own vehicles, their experience would be enhanced by reduced congestion and the ability to include interpretation with transit or tour operations. However, most of the visitors to the park come off I-90 for a relatively short stop, while on their way to somewhere else. Due to the "passerby" nature of their trips to the park, many users would perceive it as very inconvenient that they have to leave their vehicles at an off- or on-site parking lot and take transit to the tour road. Furthermore, requiring visitors to take transit during the off-peak seasons, when visitor volumes are usually low, are likely to cause visitor frustration and confusion.
- B. (Pass) This option would minimize visitor impact on cultural and natural resources by keeping private vehicles off the tour road.
- C. (Pass) By keeping private vehicles off the tour road or out of the park (when sufficient offsite parking is provided), this option would effectively eliminate vehicle-related congestion and parking shortage in the park.
- D. (Fail) Mandatory transit would facilitate better asset management and reduce pavement deterioration; however, it would be uneconomical and difficult to maintain and operate a transit system during off-peak seasons when visitation is low.
- E. (Pass) Mandatory transit is expected to offer safety benefits to all visitors by significantly reducing the number and severity of vehicle-related conflicts in the park.

This option is not carried forward to the next step of the study and is therefore eliminated from further consideration.

# 3.4 OPTIONS RECOMMENDED FOR FURTHER DEVELOPMENT

As described in the previous subsection, 5 of the 13 initial options rated neutral or pass in all categories, while the others failed in at least one category. The study team determined that those options passing or neutral in all of the initial screening criteria would be carried forward to the next stage of further development and refinement and subjected to detailed screening.

In summary, three distinctive construction options, one no-build (management improvements), and one transit option were recommended to be continued to the next stage of development and detailed screening. The results from the initial screening are listed in Table 3-3.

Initial Screening Options	Initial Screening Results	Further Refinement and Evaluation				
CONSTRUCTION OPTIONS						
1) Repair Tour Road and Reconfigure Parking	Pass or Neutral	Yes				
2) Widen Road and Expand Existing Parking Lots (4R Project)	Pass or Neutral	Yes				
3) One-Way Loop via I-90 Frontage Road (GMP Option)	Pass or Neutral	Yes				
4) One-Way Loop via U.S. 212	Fail	No				
5) Detached Multi-use Trail Paralleling the Tour Road	Fail	No				
6) Alternate Infrastructure Improvements	Fail	No				
NO-BUILD OPTIONS						
7) Management Improvements	Pass or Neutral	Yes				
8) Seasonal Reservation/ Permit System	Fail	No				
9) Permanently Close Road to Motorized Vehicles and Maintain it as a Trail	Fail	No				
TRANSIT OPTIONS						
10) Voluntary Transit for All Visitors	Pass or Neutral	Yes				
11) Mandatory Peak/Seasonal/Special Events Transit for All Visitors with Motorized Vehicles	Fail	No				
12) Mandatory Transit for Visitors with Oversized Vehicles	Fail	No				
13) Mandatory Year-round Transit for All Visitors with Motorized Vehicles	Fail	No				

#### Table 3-3: Recommended Options for Further Development

Source: URS Corporation.

# 4. DETAILED SCREENING

The second step of the development and evaluation of options process, detailed screening, involved the refinement of the options that passed the initial screening to a greater level of detail, as well as application of a set of detailed screening criteria to evaluate the transportation options. This section presents the refinement and evaluation process and results from the detailed screening.

# 4.1 **REFINEMENT OF TRANSPORTATION OPTIONS**

This subsection presents and defines the refined transportation options, following the initial screening and further development and analysis. Input from the Evaluation of Options Workshop that was conducted at the park on May 7, 2012 (Appendix C) was taken into consideration. It is noted that options 1, 2, 3, and 7 have been renamed Options I, II, III, and IV for the detailed screening. Option 10 evolved into three transit options V, VI-A, and VI-B for the detailed screening.

# Option I – Repair the Tour Road and Reconfigure Parking

Option I is a reconstruction project that would repair, but not substantially increase, the footprint of the existing tour road. This option is illustrated in Figure 4-1 and Figure 4-2. The following proposed features define the key components of this transportation option:

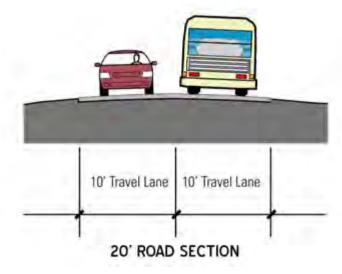
- 1. The tour road from the visitor center to Reno-Benteen Battlefield, approximately 5.2 miles in length, would be rehabilitated to correct structural deficiencies. The repaired road should have an enhanced pavement structure that is sufficient to withstand repeated loads of oversized vehicles.
- 2. Construction work on the tour road also includes minor widening of the tour road, where necessary, to a consistent 20-foot pavement width (Figure 4-2); applying new or recycled layer(s) of pavement material to restore or enhance the ride quality; and improving drainage where necessary.
- 3. Horizontal and vertical realignment and reconstruction are NOT included in this option.
- 4. Repairs to the tour road would be properly engineered and may widen the road slightly for standardization and proper construction.
- 5. The tour road improvements would work with existing cattle guards and box culverts.
- 6. Shoulders would not be provided; however, proper roadside treatment, such as side slopes, would be created to improve safety.
- 7. Parking lots would be reconfigured or restriped without enlarging the footprint. Appropriate signs which provide wayfinding guidance and redistribute parking to less congested areas should also be installed.
- 8. This option does not include new or expanded transit service for visitors, but would accommodate the existing interpretive Apsaalooke tours.

Figure 4-1: Option I – Repair Existing Road



Source: URS Corporation.

### Figure 4-2: Proposed Cross-section for Option I



Source: URS Corporation.

# Option II – Widen the Tour Road and Expand Existing Parking Lots (4R Project)

This option consists of a resurfacing, restoration, rehabilitation, and reconstruction (4R) project that would widen the tour road from an average 18-foot width to 24-feet wide, correct structural deficiencies of the pavement, and improve horizontal and vertical alignment. The widened tour road will have two 11-foot travel lanes with one-foot shoulders on both sides.

In addition to roadway widening and reconstruction, parking at the visitor center and Reno-Benteen Battlefield would be modified and expanded to include bus pull-outs, motorcycle parking, better accommodations for oversized vehicles, and improved traffic flow. In total, 34 new parking spaces would be added in the park.

This option was the preferred alternative in the 2005 *Environmental Assessment/Assessment of Effect: Rehabilitate Tour Road.* Although this option does not include new or expanded transit service, it would not preclude transit; the widened tour road could support future shuttle service with larger transit vehicles and the improved visitor center parking lot could serve as a staging area for transit.

This option is illustrated in Figure 4-3 and Figure 4-4.

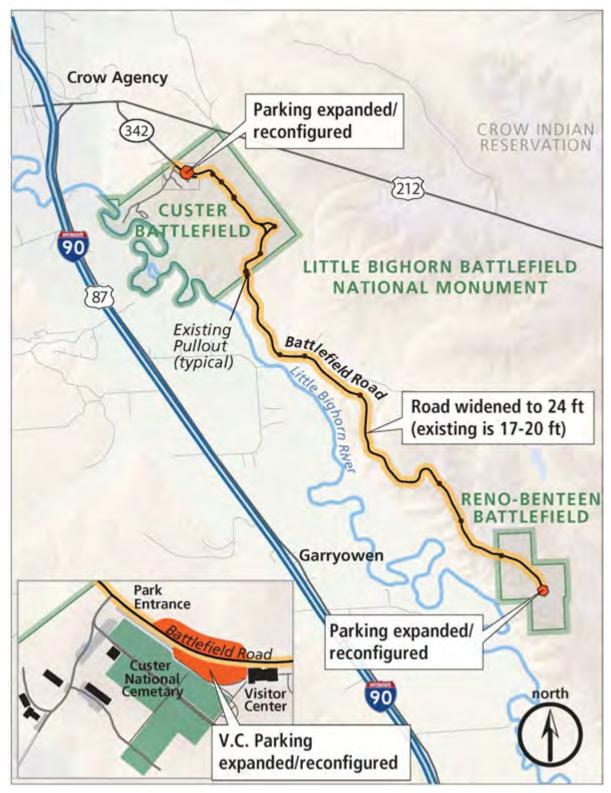
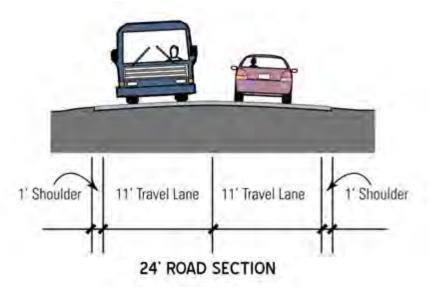


Figure 4-3: Option II - 4R Road Widening and Parking Expansion

Source: URS Corporation.

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# Option III – GMP One-Way Tour Loop via I-90 Frontage Road

This option would extend the tour road from Reno-Benteen Battlefield south and west to the I-90 frontage road, forming a counter-clockwise one-way tour loop. The park's General Management Plan (originally published in 1986 and updated in 1995) calls for a new visitor orientation/administration facility which should be located with convenient access from I-90. The tour would start at the new visitor orientation facility, proceed on the I-90 frontage road to Reno's first skirmish line site at Garryowen, and then cross under I-90 to arrive at Reno's Crossing. The tour would then follow a new one-way road from Reno's crossing, extend southeast along the west side of the Little Bighorn River to Reno Creek, enter the existing Reno-Benteen Battlefield from the south, connect with the existing tour road, and proceed over the tour road to Last Stand Hill. This option is illustrated in Figure 4-5.

Key features of this transportation option include:

- A proposed tour road extension from Reno-Benteen Battlefield south and west to the I-90 frontage road would form a counter-clockwise one-way tour loop. This one-way loop would provide visitors the opportunity to tour the battlefield in a correct, chronological order.
- The existing tour road from the visitor center to Reno-Benteen Battlefield, approximately 5.2 miles in length, would be rehabilitated to correct structural deficiencies. The repaired road would have an enhanced pavement structure that is sufficient to withstand repeated loads of oversized vehicles.
- Construction work on the tour road also includes minor widening of the tour road, where necessary, to a consistent 20-foot pavement (Figure 4-6); applying new or recycled layer(s) of pavement material to restore or enhance the ride quality; and improving drainage where necessary.
- The repaired tour road would be converted from two-way to one-way from Reno-Benteen Battlefield to Last Stand Hill. The 20-foot wide pavement would be striped and signed to clearly designate the one-lane, one-way operation.

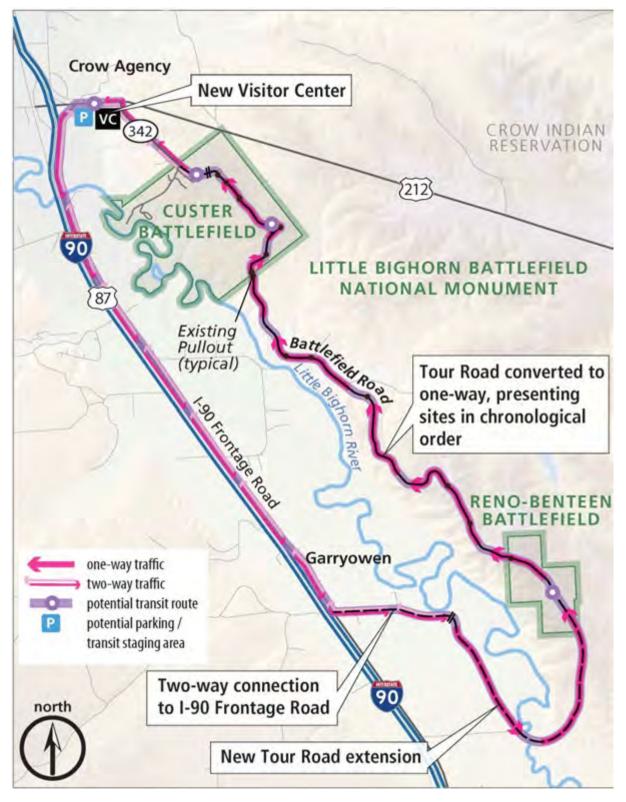
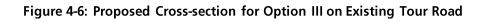
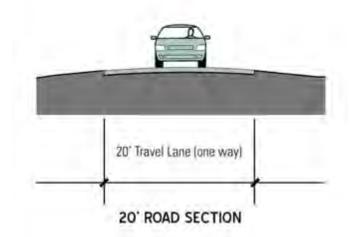


Figure 4-5: Option III - GMP One-way Tour Loop via I-90 Frontage Road

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- This option includes a seasonal transit service that would provide shuttle tours from Memorial Day through Labor Day. The shuttle tours provide a large percentage of the annual visitation the opportunity of a guided tour of the battlefield and its environments.
- New visitor parking lots would be constructed at the new visitor orientation facility and at the Reno-Crossing site west of the Little Bighorn River, where the new one-way road begins.
- For visitors who would like to tour the battlefield, they can choose to take the shuttle tour or use their own vehicles to proceed through the one-way loop; for visitors who only intend to visit the Last Stand Hill or the national cemetery, they may drive along the current access road, Montana Highway 342, from the north to enter the park at the existing entrance station.

## **Option IV – Management Improvements**

This option is a collection of lower-cost and lower-impact operational changes to enhance the visitor experience. It utilizes existing facilities but seeks to improve communications with visitors and to smooth parking. Option IV includes various elements that could be implemented at the discretion of park management, including seasonal, peak time, and trial applications. Key features include:

- Variable message signs (VMS) could be installed on I-90 and on the access road (Montana Highway 342) before the entrance station. The message signs could alert visitors to parking options and restriction, including oversized vehicles, and provide information about special events such as times or special limitations.
- The park's internal signage/striping could be improved. The following recommendations from the 2010 Upchurch report have been retained:
  - New signage would direct visitors to additional parking areas located by the Stone House and the visitor center.
  - Change "Towed Vehicle Parking Only" to "Oversized Vehicle Parking Only." Supplement with pavement markings adjacent to the edge line that read, "Oversized Vehicles Only."

- New signage on the west side of the oversized vehicle parking area (the curb north and south of the restrooms) to indicate oversized vehicles only.
- "Additional Car Parking" directional signing at both the beginning and end of the island (north and south of the restrooms) to direct regular sized vehicles to main road parking area.
- Visitor Use Assistant(s) (VUA) could be employed on a seasonal basis to assist with managing visitors and congestion. The VUAs would proactively direct visitors to available parking and provide other critical information to entering visitors to help mitigate congestion, especially during peak events. The use of volunteers to assist with parking management is not included due to staff impacts in arranging for and managing the volunteers. The seasonal employee could:
  - Be stationed or float around inside the entrance station and parking areas to assist visitors with wayfinding and parking.
  - Help reduce regular vehicle parking in the oversized vehicle parking area.
  - Discourage parking in non-designated locations.
  - Promote use of the park's audio tour at peak times when parking is unavailable at visitor center.
  - Alternatively, existing park staff could continue to carry out these duties as part of their "collateral duties." The use of existing staff would be more flexible, only requiring deployment at peak times. However, this variation takes staff time away from other important duties.
- The visitor center parking area could be signed with time limits to encourage turnover, such as a one-hour time limit from 9 a.m. to 3 p.m. Although enforcement of time restrictions in the parking area could be difficult and require extra efforts of park staff, these restrictions have the potential to substantially mitigate congestions and conflicts in the parking area.
- Additional turnover at the visitor center parking lots could be encouraged by shortening the length of the visitor orientation movie and program.
- The park could provide cemetery tours to attract parking into the Stone House lot. While this element requires additional programming, this management strategy does not require significant construction and redistributes parking activities away from the visitor center parking lots.
- A wayfinding plan should be developed and implemented to provide clear guidance for visitors to access the park and tour the battlefield. Although the various VMS and traditional signing and striping, as described in this subsection, would collectively serve the wayfinding purpose, a comprehensive wayfinding plan should also consider other media such as the Internet, HAR, 511 phone, etc.
- No significant changes are proposed for the tour road. This option does not increase the paved footprint, nor requires construction.
- An offsite parking lot should be provided, via partnership with existing land owners, for towed vehicle drop-off and recreational vehicles that tow a smaller automobile. Potential locations include the old casino parking lot and other underutilized parking areas adjacent to the junction of US 212 and MT 342.

Some of the key features in this option are illustrated in Figure 4-7.

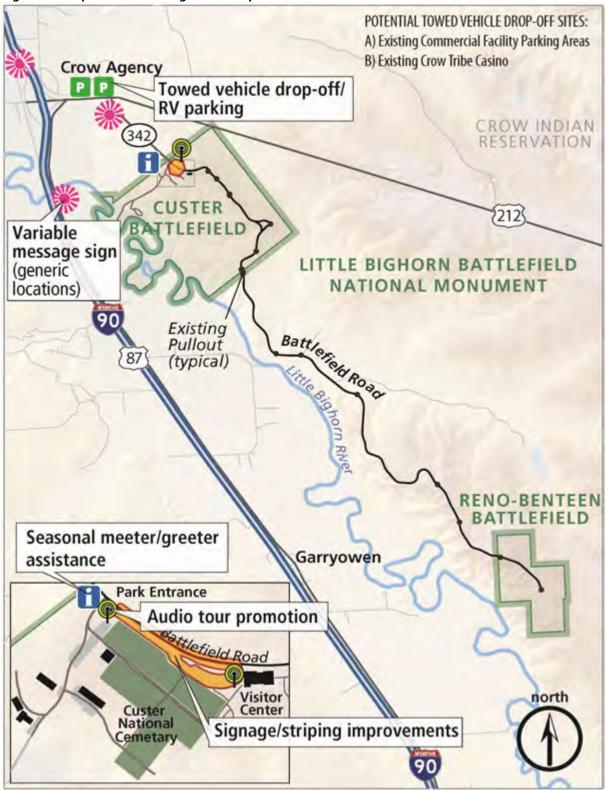


Figure 4-7: Option IV – Management Improvements

Source: URS Corporation.

The only transit option that passed the initial screening – Peak Period/Special Events/Seasonal Voluntary Transit – was further developed into three transit options as described below.

# Option V - Seasonal Transit from Offsite Staging/Parking to Visitor Center

This option would provide a seasonal shuttle service for visitors to access the park. Key features of this option are described below:

- A shuttle service would be provided between an offsite staging/parking area and the visitor center during the summer season. No intermediate shuttle stops would be provided.
- The operating season/time would be Memorial Day to Labor Day (approximately 14 weeks), 9 a.m. to 5 p.m.
- The shuttle service is not offered on the tour road south of the visitor center.
- Visitors can choose to take the shuttle or use their own vehicles, and they are allowed to use designated visitor parking inside the park, at the visitor center area, and at Reno-Benteen Battlefield.
- Variable messaging signs, as well as traditional signs and pavement markings, would be installed to notify visitors of the available shuttle, parking locations and limitations, and options to access the park.
- Under this option, Option I Repairing Tour Road and Reconfiguring Parking would be included as one element.
- Clear message needs to be delivered to visitors that if they plan to tour the battlefield via the tour road, there is no transit service on the tour road and they would have to use their own vehicles. This could be delivered prior to and at the staging area, on the access road, and at the entrance station using variable message signs, traditional information signs, transit contractor's staff, and fee collection staff.

This option is illustrated in Figure 4-8.



Figure 4-8: Option V – Seasonal Transit from Offsite Staging/Parking to Visitor Center

# Option VI-A – Seasonal Transit from Offsite Staging/Parking to Reno-Benteen Battlefield

This option would provide a seasonal shuttle service for visitors to access the park and see sights along the tour road. Key features of this option are described below:

- A shuttle service would be provided between an offsite staging/parking area, the visitor center, and Reno-Benteen Battlefield.
- Three shuttle stops are recommended: visitor center, Last Stand Hill, and the Reno-Benteen parking lot. Each stop would have a bus pull-out, a bench, and a bus sign with a supplemental plaque of appropriate schedule information. Rest facilities, such as a shelter and a restroom, will not be included at the remote sites due to significant visual impacts on the sensitive battlefield landscape.
- Shuttle stops outside of the park boundaries along the tour road are not recommended, since the park discourages parking or walking outside of the park boundaries which are mostly private properties, although the park has a 60-foot right of way along the tour road.
- Visitors can choose to take the shuttle or use their own vehicles to access the park and tour the battlefield, and they are allowed to use designated visitor parking inside the park, at the visitor center area and at Reno-Benteen Battlefield.
- The operating season/time would be Memorial Day to Labor Day (approximately 14 weeks), 9 a.m. to 5 p.m.
- Variable messaging signs, as well as traditional signs and pavement markings, would be installed to notify visitors of the available shuttle, parking locations and limitations, and options to access the park.
- Under this option, Option I Repairing Tour Road and Reconfiguring Parking will be included as one element.

# Option VI-B – Peak Days Transit from Offsite Staging/Parking to Reno-Benteen Battlefield

This transit option is very similar to Option VI-A. The only difference is that Option VI-B only provides a shuttle service during a few peak visitation days in the summer (approximately 10-15 days), including some special events (such as the park's Anniversary on June 25); while Option VI-A provides a seasonal shuttle service from Memorial Day to Labor Day. Due to their similarities, these two transit options are numbered with the same Roman number "VI", but with a different letter designation A and B.

The rationale for Option VI-B, as a variation of Option VI-A is to create a transit option that is focused only on the days when traffic, parking, and circulation are most adverse and would most benefit from transit. This approach could potentially reduce total life cycle costs for the transit operation while achieving the most important benefits for the park and the visitors. This variation concept emerged from discussions after the Evaluation of Options Workshop held in May 2012.

The characteristics of this transit variation would be essentially identical to those of Option VI-A in terms of time span of service, staging, route, etc. Bus frequency/headway would be dependent on the demand level during those peak days as well as vehicle type from the contractor. Transportation fee

collection procedures could remain the same as for the seasonal transit but may be lower due to the expected lower total life cycle cost of this concept compared to the full seasonal transit option.

The peak days only transit option introduces several issues and risks compared to the full seasonal transit service. There may be confusion for both park staff and visitors about which days have transit. Signing, web sites, and other information would need to be very clear regarding the occasional availability of the transit service. There may not be consistent staffing / drivers over the summer due to the sporadic nature of the service. Buses for this concept are most likely to come from an existing fleet (as opposed to a park-dedicated fleet for the full seasonal transit) that is available during the summer such as school buses, or other fleets with peaks in the winter recreation season. The buses would likely not have a park themed "livery" (paint scheme) to fit the park setting and make them easily identifiable and attractive. Finally, there is some risk that a willing entity may not be found to contract for so few days spread out over the summer months. But perhaps a partnership can be developed with another entity that has underutilized vehicles available during the summer months. These potential partners include a nearby school district or its transportation provider, and recreation facilities that have transit resources but whose peak season is in the winter months.

Due to its relatively low total lifecycle costs and effectiveness in mitigating the most severe traffic congestion, safety, and parking shortage by focusing on the relatively few peak days, Option VI-B could be implemented as a special events management strategy for other non-transit options, including Options I to IV. It could also be considered as the first phase, or a pilot transit program, for the full-seasonal transit options including Options V and VI-A.

Transit options VI-A and VI-B are illustrated in Figure 4-9.

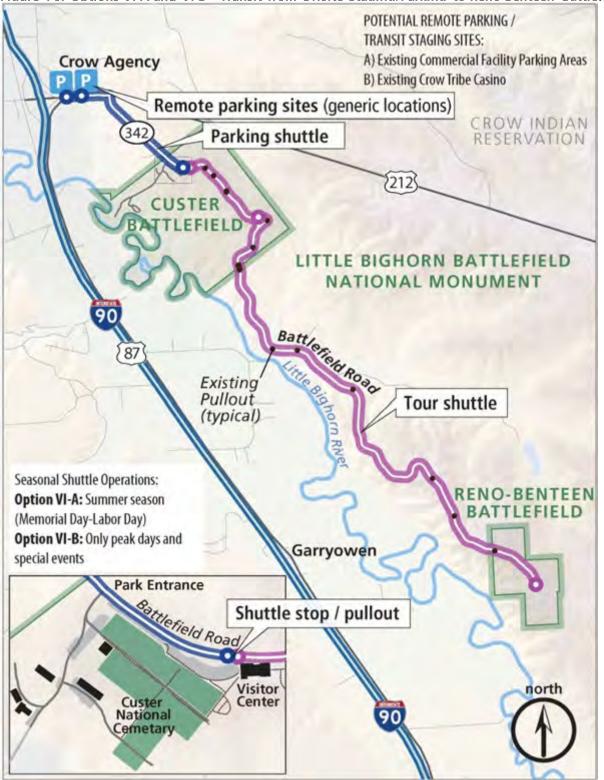


Figure 4-9: Options VI-A and VI-B - Transit from Offsite Staging/Parking to Reno-Benteen Battlefield

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