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## **ALTERNATIVE D: CANYON VIEW INFORMATION PLAZA PARKING EMPHASIS**

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### **Strategic Approach**

Alternative D would concentrate new transportation facilities entirely within the park, thereby simplifying wayfinding and providing a consistent arrival experience for all day visitors to Grand Canyon Village. In contrast to alternatives B and C, there would be no new development near Tusayan or park-operated shuttle bus service from Tusayan. All private vehicle parking for day visitors would be provided at Canyon View Information Plaza and existing parking lots in Grand Canyon Village.

This alternative would provide nearly 1,200 new parking spaces to accommodate short-term use by visitors going to Canyon View Information Plaza and the Mather Point overlook, as well as long-term parking for visitors choosing to leave their vehicles at the information plaza and travel by shuttle bus to destinations throughout Grand Canyon Village. (Visitor information and transportation management strategies would be implemented to encourage visitors to do this.) Similar to alternatives B and C, this alternative would be implemented in phases, with up to 790 parking spaces provided initially at Canyon View Information Plaza. Based on the results of an adaptive management program to closely monitor the success of this initial phase, up to 400 additional spaces could be provided if needed.

Shuttle bus service as described under “Elements Common to All Action Alternatives” would provide access to visitor destinations throughout the village. Visitors would continue to have the option of driving throughout Grand Canyon Village and parking at one of the existing parking lots.

The following text further describes alternative D, and the key elements of this alternative are summarized in Figure 18.

### **Transportation System Elements**

#### ***Canyon View Information Plaza and Mather Point***

Several modifications and additions would be made at Canyon View Information Plaza and Mather Point, similar to alternative B, which would result in convenient access and would maximize the use of Canyon View Information Plaza by visitors. However, under alternative D the scale of park development would be larger than in alternative B because up to 1,190 parking spaces would be provided south of the existing plaza area, with access for private vehicles as well as tour buses by way of a rerouted South Entrance Road.

The South Entrance Road would be realigned to loop around Canyon View Information Plaza to the south and west, and roadway elements would be similar to alternative B; however, the realigned road would be farther south and west than under alternatives B and C to accommodate a larger parking area. Where feasible, the existing service road would be incorporated into new parking lots or the realigned South Entrance Road; otherwise, portions of pavement would be removed and the landscape restored. As detailed in “Elements Common to all Action Alternatives,” Canyon View Information Plaza would be more readily accessible and inviting, with new amenities such as the theater and bike rental facility.

Changes at Mather Point would include the removal of the South Entrance Road, the parking lot, and informal roadside parking. Natural resource conditions would be restored in areas currently impacted by roadside parking near Mather Point. The intent of these changes would be to reduce congestion, roadside overflow parking, and associated resource impacts at Mather Point and to make the area near the canyon rim more calm, contemplative, and pedestrian-oriented. (See Figure 19 for proposed improvements at this location.)

**Vehicle Parking.** The initial phase of development under alternative D would provide 790 parking spaces at Canyon View Information Plaza, with up to 400 additional spaces (for a total of 1,190 spaces) at full build-out. Parking would be provided for private vehicles, RVs, and persons with disabilities. The parking area would accommodate visitors making short-term stops at Canyon View Information Plaza, as well as those parking longer and taking a shuttle bus to other destinations or hiking or biking. Similar to alternatives B and C, parking would be built in clusters of no more than 200 spaces each, and the clusters would be separated by vegetated islands. The layout and design details would be the same as the other action alternatives so as to blend in with the existing landscape as much as possible. New pedestrian paths would connect with the plaza, Mather Point, shuttle bus stops, and the Greenway Trail and Rim Trail. Parking lot and pedestrian path lighting would also be provided in accordance with guidelines for the protection of night sky.

**Tour Bus Parking.** Similar to alternatives B and C, a 40-space commercial tour bus parking and a drop-off location would be provided (see Figure 19). The existing Kaibab shuttle bus route stop would be converted to use for tour bus passenger loading and unloading. The new tour bus parking area would be northeast of the existing bus parking area at Canyon View Information Plaza to provide closer access to Mather Point than now exists. The existing path between the plaza and Mather Point would provide pedestrian access from the drop-off area to the canyon rim. Similar to alternative B, tour bus passengers could either return directly to their parked bus after viewing the canyon or walk downhill to the information plaza. The new tour bus parking and drop-off facilities would be included in the initial phase for alternative D.

**Mather Point.** The treatment of the Mather Point parking area would be similar to alternative B, with the removal of the parking lot and the provision of a shuttle bus turnaround and stop at the west end, along with a shelter,

seating, and signs. As described in “Elements Common to all Action Alternatives,” improvements would be made to the primary Mather Point overlook to make it accessible to all visitors, including those with disabilities. Access to Mather Point would be from existing and new pedestrian paths or by means of shuttle bus service. The treatment of areas where the South Entrance Road and parking lot would be removed would be the same as in alternative B, with revegetation and the addition of pedestrian paths as needed to facilitate circulation around the rim overlooks. To the extent feasible, small-scale features such as benches and railings would be retained. Along the rim, additional walls and/or guardrails might have to be installed for enhanced visitor safety. The changes to the Mather Point area would be implemented in the initial phase of alternative D.

### **South Entrance Station**

Proposals for the South Entrance Station would be similar to those in alternative B, with one service lane added to accommodate visitation growth and sustain recent improvements in waiting times and congestion. Alternative D would have the highest vehicular demand at the South Entrance Station because all day visitors would be arriving in private vehicles, as opposed to alternatives B and C where some would enter by shuttle bus. A total of six service lanes and a bypass lane, which would be constructed as part of a separate project (see Appendix D) would be available at the station. If needed during peak visitor arrival times, the bypass lane could be operated as a normal service lane with a kiosk to provide the capacity of seven lanes. As in alternative B, a permanent kiosk could replace the prefabricated kiosk in lane 5. If the stacked kiosks in lanes 2 and 3 continue to provide adequate capacity, they could be replaced with permanent kiosks or removed at the discretion of park management. The initial phase of development for alternative D would not include any improvements to the South Entrance Station.

**FIGURE 18. ALTERNATIVE D: OVERVIEW**

**South Rim Shuttle Bus Routes**

- Increase service frequency on Hermits Rest Route
- Streamline route pattern for Village Route and increase frequency
- Extend Kaibab Trail Route to serve some areas previously served by Village Route and increase frequency

**Village Historic District**

**Tour Buses**

- Accommodate loading/unloading of up to 6 buses at one time at Bright Angel Lodge
- Provide up to 14 parking spaces at Parking Lot E
- Maintain 12 temporary parking spaces south of Powerhouse
- Provide tour bus management staff at Bright Angel Lodge
- Provide overnight parking at Lot D for up to 9 buses

**Grand Canyon Railway**

- Improve tour bus access for rail passengers; relocate tour bus loading to Lot D (accommodate up to 9 buses). Connect passenger platform to provide access to tour bus loading

**Private Vehicle Parking**

- Remove 111 parking spaces at Lot D
- Remove a small number of parking spaces at Lot E
- Maintain all other existing parking spaces

**Transit Maintenance Facility**

- Construct a new maintenance facility with admin/operations and wash bay; parking for buses and employees

**South Entrance Station**

- Construct one new inbound service lane - six inbound service lanes total
- Construct new fee administration building
- Provide permanent kiosk at 5th lane

**Yavapai Observation Station**

- Maintain existing visitor parking
- Provide up to 3 tour bus parking spaces (Nov. - Feb. Only)

**Yaki Point/South Kaibab Trailhead**

- Increase frequency of shuttle bus service to Yaki Point and South Kaibab Trailhead
- Restripe existing paved area at Yaki Point to provide 7 tour bus parking spaces

**Canyon View Information Plaza (CVIP)**

- Realign South Entrance Road to south of CVIP
- Construct 40 tour bus parking spaces and tour bus drop-off
- Construct up to 1,190 visitor parking spaces
- Construct theater and bike rental facility
- Provide food items
- Remove visitor parking at Mather Point
- Provide shuttle bus stop(s) for Village Route and Kaibab Trail Route
- Provide shuttle bus stop at Mather Point

**Greenway 3 (Proposed)**

**New Greenway**

- New Greenway between Tusayan and park boundary

**Tusayan Community**

- No new facilities or services

**Legend**

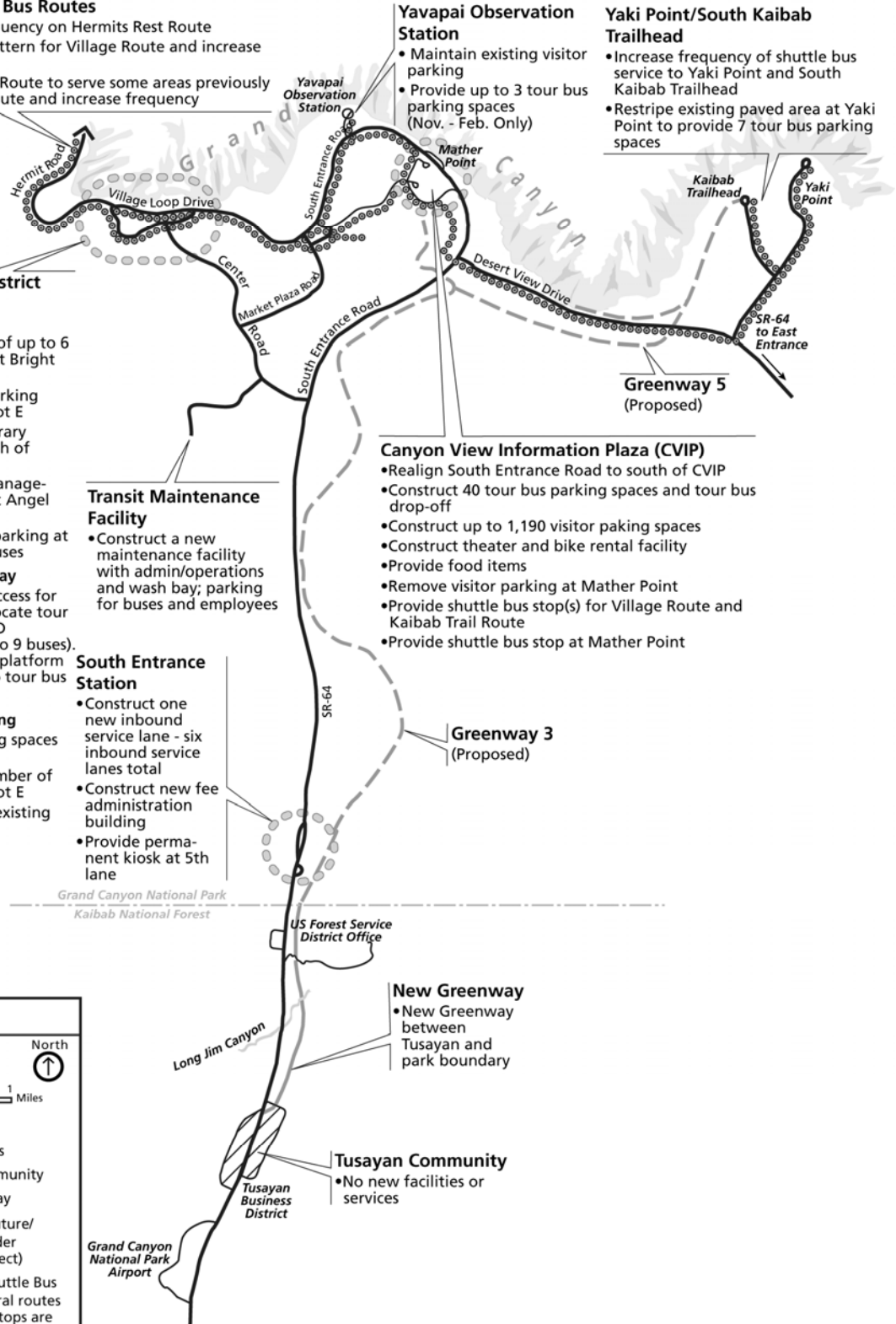
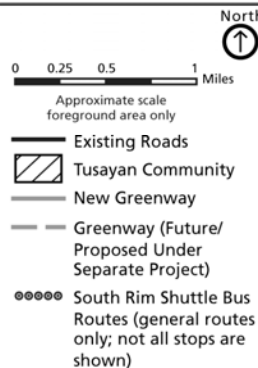
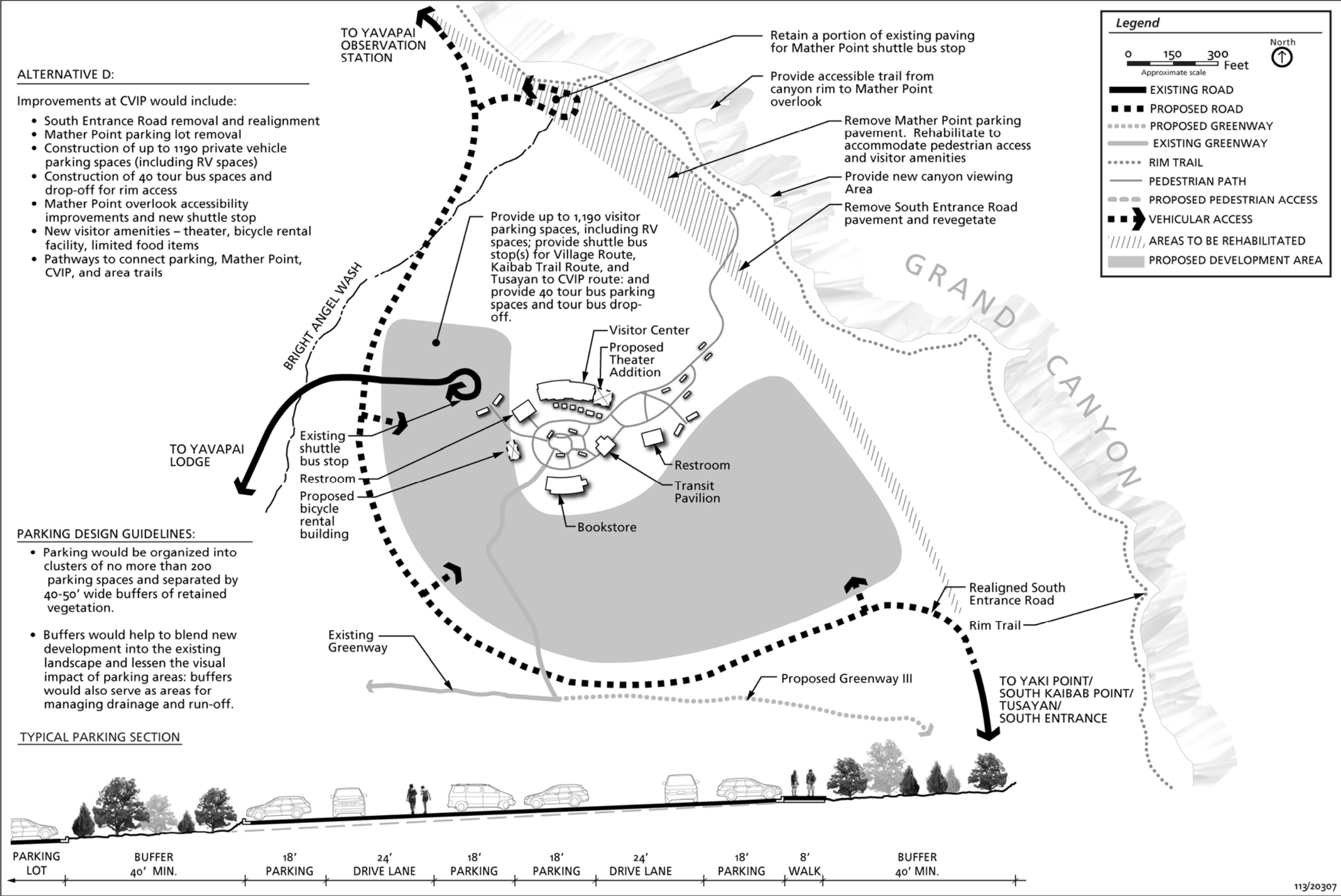


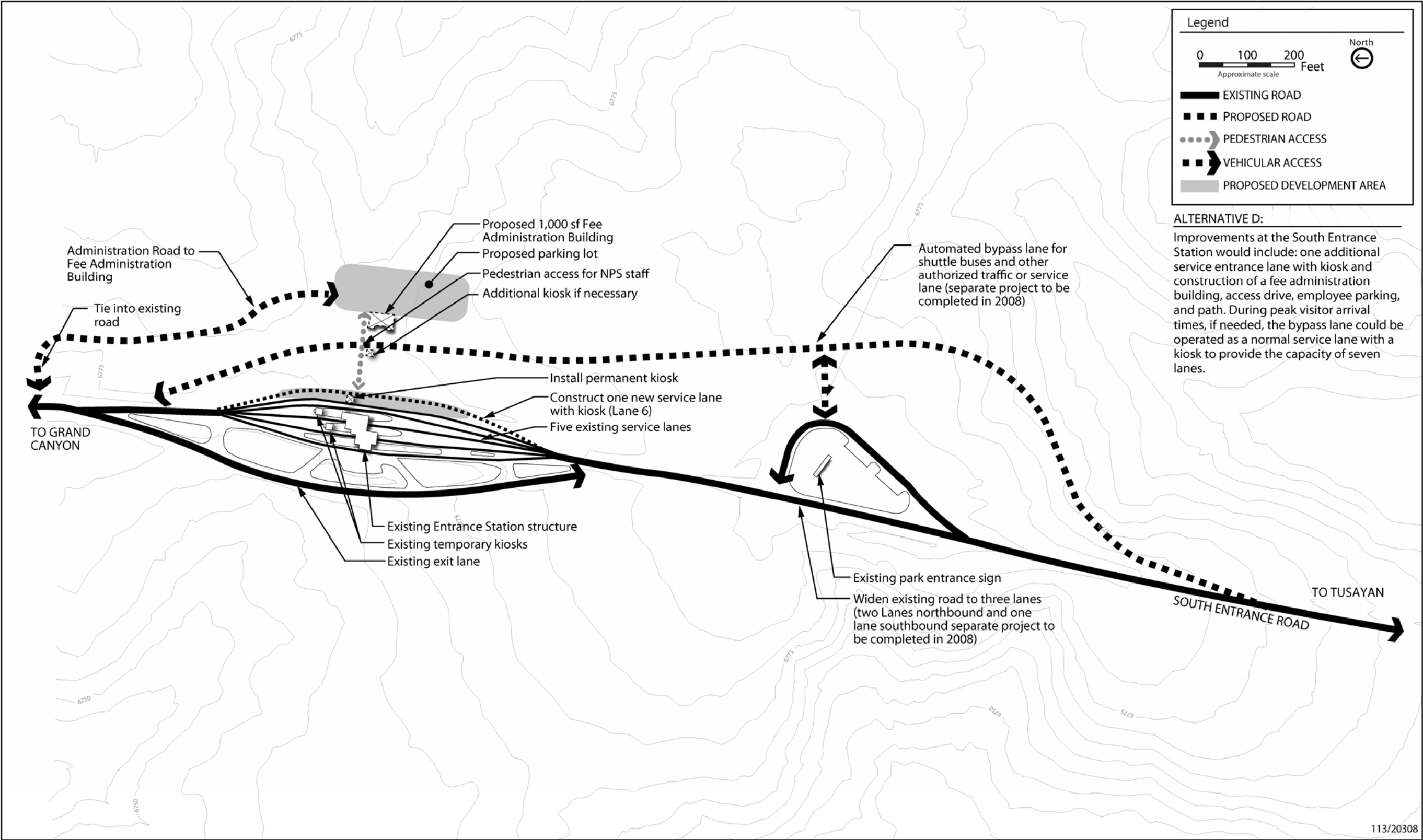
FIGURE 19. ALTERNATIVE D: CANYON VIEW INFORMATION PLAZA / MATHER POINT IMPROVEMENTS



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FIGURE 20. ALTERNATIVE D: SOUTH ENTRANCE STATION IMPROVEMENTS



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### Tusayan

No new facilities or services beyond those common to all action alternatives would be constructed in Tusayan.

### Shuttle Bus System

As previously described under “Elements Common to All Action Alternatives,” the South Rim shuttle bus service would be enhanced. However, no park-operated shuttle bus service would be provided to the Tusayan area.

### Implementation Strategy

Alternative D would be implemented in phases, similar to alternatives B and C. The first phase of transportation improvements would be in operation for the 2010 peak visitation season. Since this alternative encompasses a number of projects that would be adjacent to or within the same footprint as existing visitor facilities and services, park staff would work closely with the contrac-

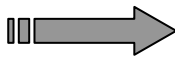
tor(s) for each major project to carefully sequence construction activities to minimize disruption to existing visitor facilities and services. The initial phase would encompass construction of most of the proposed modifications at Canyon View Information Plaza and Mather Point. Improvements to the South Rim shuttle bus routes and the implementation of proposed transportation management strategies would also occur under the initial phase of work. See Table 11 for a possible phasing approach.

Similar to the other action alternatives, the first phase of improvements would be evaluated and monitored, and through an adaptive management approach, additional phases of transportation improvements would be implemented if needed.

### Costs

Costs for transportation improvements under alternative D (in 2010 dollars) are summarized in Table 12. Gross construction costs for

**TABLE 11. ALTERNATIVE D: IMPLEMENTATION PHASING**

Phase I (Target Implementation by 2010)	Monitor and Evaluate	Future Phases (by 2020)
<b>Canyon View Information Plaza / Mather Point</b> <ul style="list-style-type: none"> <li>• Construct 790 new visitor parking spaces.</li> <li>• Implement shuttle bus loading and drop-off improvements.</li> <li>• Construct roadway improvements and pedestrian facilities.</li> <li>• Construct new tour bus drop-off and up to 40 new tour bus parking spaces.</li> <li>• Construct theater and bike rental facilities; provide limited food items.</li> <li>• Implement accessibility improvements at Mather Point.</li> </ul> <b>Village Historic District / Maswik Lodge Area</b> <ul style="list-style-type: none"> <li>• Re-stripe Lot E to define 14 tour bus parking spaces and parking for RVs.</li> </ul> <b>Shuttle Bus Service</b> <ul style="list-style-type: none"> <li>• Make improvements to South Rim shuttle bus routes (with less frequent service on some routes than planned for 2020 conditions).</li> <li>• Provide two new shuttle bus stops near Market Plaza.</li> </ul> <b>Transportation Management</b> <ul style="list-style-type: none"> <li>• Implement strategies such as wayfinding improvements, visitor outreach, enhanced trip information, and expanded offsite entrance permit/pass sales.</li> <li>• Employ methods to manage traffic and parking on days with visitation higher than the design day.</li> </ul>		<b>Canyon View Information Plaza</b> <ul style="list-style-type: none"> <li>• Construct up to 400 additional parking spaces.</li> <li>• Install other visitor amenities such as additional wayside exhibits, picnic tables, and seating.</li> </ul> <b>Village Historic District Area</b> <ul style="list-style-type: none"> <li>• Implement Grand Canyon Railway improvements: construct new access road, and 9 tour bus loading/unloading spaces.</li> <li>• Remove private vehicle parking spaces at lot D.</li> </ul> <b>South Entrance Station</b> <ul style="list-style-type: none"> <li>• Construct additional service lane and kiosks, if needed.</li> <li>• Construct fee administration building.</li> </ul> <b>Shuttle Bus Service</b> <ul style="list-style-type: none"> <li>• Expand rim shuttle to meet increased demand.</li> <li>• Construct new shuttle bus maintenance facility.</li> </ul> <b>Other Improvements</b> <ul style="list-style-type: none"> <li>• Implement Greenway Trail expansion and enhancements.</li> <li>• Implement additional transportation management strategies.</li> </ul>

**TABLE 12. ALTERNATIVE D: ESTIMATED CAPITAL AND OPERATING COSTS**

Capital Costs	2010 Dollars
Construction Costs	
•Transportation Elements	\$25,411,000
•Other Site Improvements	\$4,093,000
Construction Cost Subtotal	\$29,504,000
Bus Purchases	\$3,520,000
<b>Capital Cost Total</b>	<b>\$33,024,000</b>
Annual Operating Costs*	2007 Dollars
•Transportation Management	\$521,000
•Shuttle Bus Operations	\$1,841,000
•Facility Maintenance	\$440,000
<b>Annual Operating Cost Total</b>	<b>\$2,811,000</b>

\* Estimated annual operating costs are in addition to the current costs for shuttle bus transit operations, which were \$4,300,000 in 2007.

transportation elements would be up to \$25,411,000, and for other site improvements, \$4,093,000, for a total of \$29,504,000. In addition, there would be up to \$3,520,000 in capital costs for bus purchases. The total for capital costs would be \$33,024,000.

Estimated annual operating costs under alternative D (in 2007 dollars) would be \$521,000 for transportation management operations (which includes implementation of transportation management operational strategies), up to \$1,841,000 for shuttle bus operations, and \$440,000 for facility maintenance. Total annual operating costs would be \$2,811,000. Estimated annual operating costs are in addition to current shuttle bus transit operational costs which were \$4,300,000 in 2007.

## **ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED STUDY**

The Council on Environmental Quality defines reasonable alternatives as those that are economically feasible and practicable. The following alternatives or elements of one or more alternatives were identified by NPS staff, agencies, or the public, but were later dismissed. In accordance with *Director's Order #12*, all alternatives have been evaluated using the following screening criteria (NPS 2001b):

- technical or economic infeasibility

- inability to meet project objectives or resolve need
- duplication with other, less environmentally damaging or less expensive alternatives
- conflict with an up-to-date and valid park plan, statement of purpose and significance, or other policy, such that a major change in the plan or policy would be needed to implement
- too great an environmental impact

In addition, *NPS Management Policies 2006* requires that park planning alternatives be practicable to implement. The impact analysis in Chapter 3 of this document analyzes the preferred alternative and reasonable alternatives (including the no action alternative), based in part on the DO #12 screening criteria.

As a result of screening the alternatives or elements of alternatives, the alternatives or elements described below were not carried forward for evaluation in this document. The reasons for eliminating alternatives and plan elements are also given.

## **Overall Alternatives**

### ***Provide All Visitor Parking outside the Park***

Members of the public suggested at scoping meetings that the National Park Service minimize vehicle traffic in the park by implementing a mandatory day-visitor transportation system with visitor parking at a facility near Tusayan, consistent with previous plans for light rail transit. As discussed in Chapter 1, several concepts that would require all day visitors to park outside the park and ride mass transit into the park have been considered in previous planning studies. NPS managers concluded that the high cost of any such alternative and the recent lack of visitation growth would make such a system difficult to implement in the near term. During congressional briefings, the National Park Service received strong support to implement an alternative that was predicated on

providing a voluntary transportation system for day visitors.

Other public comments suggested eliminating parking within the park and being consistent with the 1995 *General Management Plan*, which included reducing or eliminating personal vehicle use on the South Rim. This proposal was predicated on accommodating visitation levels that far exceed current use levels. Because park visitation has been largely flat since 1995, the need to remove personal vehicles from the park is not as pressing today as it was assumed to be when the *General Management Plan* was developed. The National Park Service intends to manage parking and vehicle traffic levels anticipated through the year 2020, and the range of alternatives considered in this document will meet those needs. The intent of the *General Management Plan* will still be realized, and no alternative that is being considered would preclude future transportation systems from being implemented, including those that might be required for substantial visitation increases, and/or limiting where vehicles could be allowed. The alternatives in this document have been defined in a way to accommodate the future implementation of other appropriate transportation solutions when visitation levels warrant a greater investment.

#### ***Provide All New Visitor Parking outside the Park***

Members of the public suggested at scoping meetings that the National Park Service minimize vehicle traffic in the park by locating all new visitor parking at a facility near Tusayan, while continuing the use of existing visitor parking in Grand Canyon Village. This alternative was dismissed because providing all new visitor parking outside the park would not address the need to improve access to Canyon View Information Plaza. If no new parking was provided at Canyon View, day visitors driving to the South Rim and overnight visitors would not be able to stop at the Canyon View Visitors Center to receive trip planning and orientation information.

Instead, they would have to find parking in an existing lot and take a shuttle bus to Canyon View Information Plaza to get detailed trip planning information. As a result, a large share of visitors would likely not go to Canyon View Information Plaza (see the discussion of Canyon View Information Plaza parking options below for more details).

Another alternative that arose during public scoping suggested building a parking lot far outside the park, such as at Cameron, and subcontracting its operation to the Navajo Nation. Parking locations outside the park were evaluated in the range of potential alternatives; however, parking served by the park's shuttle bus system needs to be relatively close to Grand Canyon Village to be feasible and financially viable. The reasons described above would also apply to this suggestion. This plan does not preclude private entities from establishing transit operations into the park from more remote locations, such as Cameron.

### **South Entrance Station**

#### ***Move the South Entrance Station North***

This alternative element would move the South Entrance Station from the current park entry on SR 64 farther north, closer to Canyon View Information Plaza and just south of Center Road. This element was dismissed from further consideration because it would not be technically or economically feasible. Moving the entrance station would require the road to be substantially widened at this location to accommodate all required entrance lanes. New infrastructure would also be required for the entrance station, including buildings and utilities (electricity, water) for computers, lights, restrooms, etc., making this option difficult to implement and increasing the cost. In addition, the current entrance station location would continue to allow personnel to address any potential security issues encountered farther away from the major park facilities.

***Move the South Entrance Station to Canyon View Information Plaza***

During public scoping, it was suggested that the entrance station be moved to Canyon View Information Plaza. This would mean that visitors could bypass the entrance station to access Grand Canyon Village by using Center Road and could access Desert View Drive without going through the entrance station. Consequently, additional entrance fee enforcement would be required. Therefore, this alternative was eliminated from further analysis.

***Construct a Fee Administration Building on the West Side of South Entrance Road***

If the fee administration building was on the west side of the South Entrance Station, it would be closer to existing utilities. However, this option would involve disturbing more varied and difficult topography, resolving pedestrian safety issues (staff would have to cross exiting traffic flow), and addressing vehicle access issues (staff returning through the park would have to wait in line or cross traffic to access the bypass lane). These issues were minimized or eliminated by locating the fee administration building on the east side of the entrance station.

***Operations — Financial Incentives***

This alternative element considered providing financial incentives to encourage visitors to use a new shuttle bus service, such as reducing the park entrance fee for visitors riding shuttle buses into the park. This alternative element was dismissed from further consideration because providing incentives would be difficult to manage given the high volume of visitors and traffic entering the park, particularly during peak periods. The costs associated with implementing this action would negate the gains that would be expected from encouraging shuttle bus use. In addition, park entrance fees are critical for supporting transit operations. If park entrance fees were reduced, revenue to operate an expanded transit system might be insufficient.

***South Rim Shuttle Bus Routes***

The following options for South Rim shuttle bus routes were considered but dismissed for the reasons listed below.

***Option A***

Under this option shuttle routes would be consolidated, and one comprehensive Rim route would serve all primary east-west sightseeing and visitor access needs. A separate, short circulator route would be operated to provide access to locations isolated from the Rim route.

This option would not thoroughly meet the project objective of appropriately distributing visitors throughout the South Rim to provide a variety of visitor experiences. It would not allow for changes in service levels or the ability to manage visitor access differently by specific area. Providing only one primary route could preclude the ability to meet the plan's purpose of accommodating anticipated levels of visitation, possibly leading to insufficient passenger capacity and increased wait times if buses were full, or increased congestion along this one route as more shuttle buses were added to meet demand.

***Option A1***

This option would be the same as Option A, except the eastern end of the Rim route would terminate at Canyon View Information Plaza. Shuttle bus service east of the plaza would be comparable to the existing Kaibab Trail route.

This option would not thoroughly meet the project objective of appropriately distributing visitors on the South Rim to provide a variety of visitor experiences. The option would not allow for separate access management of the Hermits Rest route area. Under current conditions, the Hermits Rest shuttle bus service is frequently unable to meet passenger demand in the summer months. Therefore, eliminating the Village route and extending the Hermits Rest route into areas served by the Village route could exacerbate existing capacity prob-

lems by having to accommodate a substantial number of additional passengers making both short and long trips.

### **Option B**

This option would eliminate the Yavapai Observation Station from the Village route. Access to this location and Mather Point would be provided by extending the Kaibab Trail route. Decreasing the number of stops on the Village route by shifting them to the Kaibab Trail route, which currently serves fewer stops, could help redistribute visitors on the South Rim. However, the Village route would still have circuitous movements that would be inconvenient for visitors, contributing to long travel times and inefficient operations.

### **Option C**

Option C would combine elements of options A and B by extending the Hermits Rest route to Canyon View Information Plaza, eliminating the Village Route, and providing access to the Yavapai Observation Station and Mather Point by extending the Kaibab Trail route. As with option A, a short circulator route would provide access to isolated locations.

This option was dismissed for the same reasons as option A1.

### **Slow-Moving Shuttles**

A suggestion was made during public scoping that slow-moving shuttle vehicles with seating facing the rim should be provided from Canyon View Information Plaza to Grand Canyon Village, so that visitors could hop on and off. This option would likely result in safety hazards because visitors could slip and fall while boarding or getting off the vehicles. It also would not meet the purpose of and need for action, which focuses on enhancing traffic flow and providing adequate parking.

### **Expansion of Shuttle Bus Service into Residential Areas**

This option would expand shuttle bus service into residential areas for NPS and concessioner employees. However, the purpose of this plan is to develop a transportation plan for visitor use. Employee commuting, ride sharing, and similar options could be addressed using travel demand strategies outside the scope of this plan. This option was dismissed from further consideration because it would not meet the project purpose of enhancing visitor experiences.

### **Canyon View Information Plaza**

#### **Parking Options**

A range of design options for parking facilities, road realignments, and trail connections were developed for each of the plan alternatives at Canyon View Information Plaza. These design options were evaluated by an interdisciplinary team of park staff and consultants using the Value Analysis process, which the National Park Service has adopted as a tool for decision making. The process evaluated the alternatives against several factors, including visitor experience, resource protection, park operations, safety, socioeconomic conditions, and cost. The Value Analysis process provided a rigorous means to identify the best design options for Canyon View Information Plaza under each plan alternative. The results of the evaluation are available in the “Value Analysis Study, Grand Canyon National Park, South Rim Visitor Transportation Plan” (NPS 2007h). Those with the most advantages are included as part of the action alternatives analyzed in this document.

#### **Pedestrian Overpass from Canyon View Information Plaza to Mather Point**

A suggestion was made to retain the South Entrance Road and build a pedestrian overpass (bridge) for access to Mather Point from the parking area at Canyon View Information Plaza. According to the Federal Highway Administration, studies have shown that many

pedestrians will not use an overpass if they can cross at street level in about the same amount of time. Overpasses work best when the topography allows for a structure without ramps (e.g., over a sunken freeway). To make an overpass accessible, ramps would need to be very long; and many visitors would likely choose to go around the structure and cross at street level. In addition, an overpass so close to the rim would create a substantial visual impact. For these reasons, this alternative element was dismissed.

## **Other Parking Options**

### ***Overflow Parking***

This project element would develop overflow parking at Southgate for use on days with greater visitation than the design day. Southgate is east of South Entrance Road at the Center Road intersection. Parking at this location would be difficult to implement. New overflow parking facilities would require utilities, restrooms, shelters, provisions for shuttle bus loading, and an additional shuttle bus route with an associated bus fleet, operators, and maintenance facilities. These investments would not be cost-effective since they would be used no more than 10 days per year. Wayfinding and visitor management would be difficult, since this location would not be attractive to visitors or appear to be a logical place to park. Other suitable parking areas would be easier to manage, for example, having visitors leave cars at lodging facilities in Tusayan. Even on busy days, parking along Desert View Drive and at Yavapai Lodge and Maswik Lodge is typically underutilized. Underused parking at various points along Desert View Drive or in the village could also be taken advantage of without having to develop a new parking facility.

More active parking management could be implemented on the busiest days to direct visitors to available parking and increase the use of all parking spaces in the South Rim area. While the option of developing overflow parking would increase private vehicle parking to meet current and future demand, it

would not necessarily improve it to the extent that other options would.

### ***Parking at South Kaibab Trailhead***

A suggestion was made to reopen the South Kaibab trailhead parking lot to private vehicles, at least to those with overnight hiking permits. This element was dismissed because the current lot is not large enough to meet the demand. Insufficient parking would result in more impacts than prohibiting parking there altogether, because the resulting overflow parking would cause visual, safety, and natural resource impacts in the area. Increased parking at Canyon View Information Plaza and improvements to the Kaibab Trail shuttle bus route would allow South Kaibab Trail users to access the trail via a short shuttle bus ride, as proposed as part of the action alternatives.

### ***Parking and Shuttle Bus Facilities at Long Jim Canyon***

Developing parking at Long Jim Canyon, which is between Tusayan and the South Entrance Station, would provide some advantages because the site has gentle grades and relatively few trees. However, it would be very difficult to consolidate uses with prospective partners (National Geographic Society, etc.) in Tusayan. In addition, an ungulate crossing at Long Jim Canyon would be affected by development. Parking development at Long Jim Canyon would also isolate a small area of national forest system land between the new parking facility and Tusayan, which would be difficult to manage.

### ***Parking and Transit Facilities at Southgate, Wet Dump, or Burn Sites***

Parking at the Southgate site (east of the intersection of South Entrance Road and Center Road), the wet dump (west of South Entrance Road and south of Center Road), and the burn site (east of South Entrance Road and south of Desert View Drive) was considered during the development of alternatives. These sites all lack existing utility ser-



vices, have not been zoned for visitor development, and would not be viewed by visitors as logical places to park and begin their visits. These sites are remote from existing visitor services and would be expensive to develop.

The Southgate and wet dump sites have been disturbed, but developing parking would require additional disturbance for road connections and utility services. The burn site, although impacted by fire, is an undeveloped site, which would be impacted by a new parking facility. In addition, the NPS maintenance storage facility (the “boneyard”) would need to be relocated to develop a shuttle staging area at Southgate, which would add to overall transportation system costs.

#### ***Shuttle Site Bus Staging and Parking at Moqui Lodge or the Waste Pond Site***

The suggestion to create parking and shuttle staging areas at the Moqui Lodge site or the waste pond site was dismissed because these areas are not conveniently located relative to Tusayan, requiring visitors to drive beyond this gateway community to access shuttle bus service. The Moqui Lodge site is on national forest system land, and it has recently been revegetated and rehabilitated. Development of new facilities would conflict with USFS plans for this site to remain undeveloped.

#### ***Tour Bus Parking at Bright Angel Lodge***

Expanded tour bus parking was considered at Bright Angel Lodge. However, physical constraints at this location and a high concentration of pedestrians would make it difficult to implement. The action alternatives propose continuing the use of six tour bus loading and unloading spaces at this lodge, with increased tour bus parking at Canyon View Information Plaza, lot E, and between the livery stable and the powerhouse.

### **Shuttle Bus Maintenance Facility Options**

#### ***Shuttle Bus Maintenance Facility in Tusayan***

This option would develop a shuttle bus maintenance facility in Tusayan. However, not enough land is available in Tusayan to accommodate such a facility, and previous planning in accordance with the National Environmental Policy Act identified a site within the park for this purpose. A maintenance site inside the park would reduce operating costs by limiting the distance vehicles would have to travel to and from the facility.

#### ***Shuttle Site Bus Maintenance Facility at Moqui Lodge or the Waste Pond Site***

These options consider national forest system land at the former Moqui Lodge and the waste pond site, west of SR 64 between Tusayan and the South Entrance Station. The U.S. Forest Service recently restored the lodge and waste pond sites and intends for them to revert to natural conditions. The sites are near the USFS office and residential facilities, which could be affected by noise from a maintenance facility. Since the majority of the shuttle bus service area is to the north, the use of either of these sites would be operationally inefficient. Also, utilities in the area are inadequate to support this kind of facility. Even though the Moqui waste pond site is farther from the highway and the USFS administrative facility (which would result in less visual, noise, and dust impacts to the residential area), the same constraints would apply.

#### ***Improvement of the Existing Park Shuttle Bus Maintenance Facility***

This option would improve, but not expand, the existing bus maintenance facility in the park. This facility has exceeded its design life and is inadequate for maintaining the existing fleet. A larger fleet and changes in bus technology, including possible use of articulated buses, require an expanded maintenance facility. To accommodate more and larger buses, a

facility with maintenance bays and special equipment to accommodate larger vehicles is needed. A bigger site is also needed to store and wash buses.

### **Grand Canyon Railway**

Grand Canyon Railway brings an average of 650 passengers per day to the Village Historic District. Soon after their arrival, passengers either walk north to the canyon rim or board a concession-operated tour bus north of the depot, resulting in considerable pedestrian and vehicular congestion in this area. The park considered several options for unloading train passengers and also for loading them onto tour buses.

#### ***Train Passenger Unloading / Loading Operations at Maswik Transportation Center***

The park considered options for unloading train passengers at the Maswik Transportation Center (the current Backcountry Office adjacent to lot E). Options included having all passengers load and unload there or having Grand Canyon Railway tour bus passengers load/unload at the Maswik center while other passengers continue to use the historic depot. These options were dismissed because the Maswik Transportation Center is not conveniently located with respect to the major visitor destinations along the canyon rim, and because splitting the loading and unloading operations for different types of passengers would be cumbersome and confusing.

#### ***Concession Tour Bus Loading Operations South of the Train Tracks***

One option considered the extension of the train passenger platform to the west with staging of tour bus loading operations in the western part of lot D. This option was dismissed from further consideration because it would prohibit the opening of railway tracks 5, 6, and/or 7, which underlie the western part of lot D. The park wants to maintain flexibility to accommodate the potential for future expansion of train service to the park.

Another option considered the placement of tour bus staging along the south side of Village Loop Drive, parallel to the north side of the existing divided roadway (north and east of the Ranger Operations building). This option would require removal of several mature ponderosa pines, construction of an accessible trail from the railyard to the loading area, and would substantially alter the “boulevard” character along this stretch of Village Loop Drive. The park wants to minimize impacts to the Village Historic District’s circulation system and to mature vegetation. For these reasons, this option was dismissed from further consideration.

One other option considered would provide an access drive for tour buses that would extend from the southeast section of Village Loop Drive down to the railyard so that buses could stage and load passengers just south of track 6. This option would require removal of several mature ponderosa pines and construction of a new drainage structure across Bright Angel Wash. The access drive would run perpendicular to the tracks, requiring a sharp turn near the tracks which could be a safety risk under icy winter conditions. This option and the others listed above would meet the same objective but would potentially result in more impacts and/or greater safety risks than the proposed action. Therefore, these options for tour bus loading south of the train tracks were dismissed from further consideration.

### **Transportation Operation Strategies**

At a workshop in Denver in October 2006 staff from the National Park Service (Grand Canyon National Park and the Denver Service Center) and the Federal Highway Administration, along with consultants and others, identified approximately 100 potential strategies for transportation operations. All were evaluated for preliminary feasibility, and those strategies that did not meet the project purpose and need, were infeasible for park operations, or that required substantial use/redirection of park staff were eliminated.

Within parking management strategies, the team considered zoning parking areas, including designating long-term parking versus short-term parking and setting time limits on parking to influence parking lot turnover. These ideas were dismissed because the enforcement effort would not provide measurable benefits to either the park or visitors. Hikers are already encouraged to park at the backcountry office and could also be directed to park at Canyon View Information Plaza under alternatives B and D.

An option dismissed under parking management strategies was employee / concession / vendor parking management. A shuttle bus improvement strategy that included coordinating with the park concessioner to provide an employee shuttle was dismissed. Even though the transportation planning team agreed that park and concession staff contribute to traffic congestion and parking lot crowding on the South Rim, the purpose of this plan is to focus on visitor use. These issues could be addressed by park and concession management outside the realm of the South Rim visitor transportation plan.

During the top 10 visitation days, when parking demand exceeds supply, the planning team considered an idea to lease additional buses to meet peak demand. Leasing buses for 10 days a year (not necessarily consecutive days) would require an inordinate amount of effort by park staff.

Another strategy suggested increasing opportunities for commercial tour bus use by allowing access to Hermit Road. Even though Hermit Road is to be widened to improve safety, the overlooks are to be retrofitted to better accommodate shuttle buses. There will be limited room for tour buses, except those that are currently allowed under an exclusive arrangement through the park's concession contract.

Additional strategies considered but dismissed include demand pricing incentives, such as: charging a reduced fee for the seven-day park entrance pass at offsite sales outlets, reducing

entrance fees in the off season to encourage a shift in visitation to the shoulder seasons, charging a surcharge for park entrance passes in the peak season, and discount pricing for entrance pass purchase at the East Entrance to shift entries from the South Entrance. These ideas were dismissed because they could ultimately result in a loss of revenue to the park. To be successful, raised fees would have to be combined with lowered fees (e.g., \$35 at South Entrance Station from 10 a.m. to 4 p.m., and \$15 all other times), but the complexity of fee collection management operations and staffing activities to implement this strategy would be very difficult to manage, especially with varying fee structures, passes, and the potential to enter/exit at different entrances. Also, the park depends on revenue generated by sales of entrance passes to operate the park shuttle bus service. The park would also depend on revenue generated by sales of entrance passes to operate park shuttle bus service between Tusayan and Canyon View Information Plaza. These ideas would require additional analysis for creating a revenue-neutral cost incentive program.

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## **THE AGENCIES' PREFERRED ALTERNATIVE**

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The National Park Service and the U.S. Forest Service have evaluated the alternatives with respect to how well they meet the project objectives as well as their beneficial and adverse impacts on all resource topics.

Alternative B offers the best combination of long-term benefits by achieving all of the project objectives while also ensuring a high level of resource protection and enhancement of the exceptional natural and cultural resources found in Grand Canyon National Park, consistent with the National Environmental Policy Act and NPS management policies. Under alternative B the National Park Service would restore areas historically damaged by improper vehicle parking and social trailing, would employ best management practices to reduce or avoid any resource damage, and would rehabilitate

historic resources to enhance visitor access. This alternative would best fulfill the project objectives, which take into account the need to address critical transportation and visitor access issues, as well as the park's desire to enhance visitor experiences and provide greater access to park information and interpretive exhibits, maximize transportation operational efficiencies, and engage gateway communities in the plan's implementation.

Visitors to the Grand Canyon come primarily for the magnificent views and the ability to appreciate the forces of nature. Visitors also expect that they will have access to that experience. Alternative B would provide an appropriate balance between the protection of park resources and enhancement of the visitor experience by providing readily accessible, convenient parking facilities; improved orientation and wayfinding to aid in the understanding of and appreciation for park resources and values; and convenient access to Canyon View Information Plaza and Mather Point. Proposed parking would meet existing and future needs, would be convenient to most visitor use areas, and would be readily accessible by shuttle bus.

Alternative B, compared to the other action alternatives, would also allow for the greatest degree of flexibility for implementation through the use of adaptive management techniques. The National Park Service would construct only those improvements needed to address immediate transportation and visitor needs, then assess their effectiveness and modify them as needed before undertaking further construction projects. For these reasons, alternative B is the preferred alternative.

## **THE ENVIRONMENTALLY PREFERRED ALTERNATIVE**

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In accordance with *DO #12* (NPS 2001b), the National Park Service is required to identify the "environmentally preferred alternative" in all environmental documents, including environmental assessments. The environmentally preferred alternative is defined by the Council

on Environmental Quality (CEQ) as the one that best meets the following criteria or objectives, as set out in the National Environmental Policy Act, section 101:

- (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- (2) ensure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- (3) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- (4) preserve important historic, cultural, and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
- (5) achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
- (6) enhance the quality of renewable resources and approaching the maximum attainable recycling of depletable resources.

Simply put, this means the alternative that would cause the least damage to the biological and physical environment; it also means the alternative that would best protect, preserve, and enhance historic, cultural, and natural resources (CEQ 1981).

All action alternatives would meet visitor demand and reduce vehicle wait lines at the South Entrance Station, reducing frustration for both park staff and visitors when entering the park. In meeting project objectives, the impacts of alternatives B and C would be of similar types and intensity, and both are very close in meeting the definition of environmentally preferred. For example, both alternatives would require the removal of trees and vegetation to varying degrees and locations, and both alternatives would construct new parking to meet existing and future needs but with a different emphasis on the location of parking and the use of shuttle bus service. While both alternatives could directly or indirectly

impact cultural resources, alternative B would have more potential impacts.

Through the process of internal and public scoping, and after completing the environmental analysis, the National Park Service identified alternative B, the preferred alternative, and alternative C, the Tusayan parking emphasis, as the environmentally preferred alternatives in this document. Although these alternatives meet individual CEQ criteria somewhat differently, overall they do so at approximately the same level. How well each alternative does or does not meet these criteria is explained below.

***Criterion 1 — Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.***

In setting the context for discussing criterion 1, it is important to note some differences between development proposed on national forest system lands near Tusayan and development proposed in the park near Canyon View Information Plaza. Based strictly on areas of total disturbance, alternative B would result in the greatest total area of new disturbance of up to 41 acres, followed by up to 38 acres under alternative C, and up to 33 acres under alternative D. However, there are resource *value* differences between the lands in the park near Canyon View Information Plaza and national forest system lands near Tusayan that would contribute to a qualitative difference in impacts. For example,

- The vegetation near Canyon View Information Plaza is predominantly mature, old-growth piñon/juniper while the vegetation near Tusayan is predominantly ponderosa pine.
- The Tusayan flameflower is found in Kaibab National Forest but is not considered a sensitive species, while this same species is rare on the South Rim and is considered a special status species within the national park.
- There are known archeological sites within the Canyon View Information

Plaza project area that might be disturbed through proposed development, while there are no known archeological sites within proposed project boundaries near Tusayan.

Alternative A (no action) represents the existing condition of visitor transportation on the South Rim and in Tusayan. The no-action alternative would not meet this criterion as fully as any of the proposed action alternatives. While the park is currently meeting its responsibilities as trustee of the environment, because of the park's ongoing crowded visitor transportation condition, the protection of park resources, particularly social resources, would be more difficult over the long term.

Alternative B, the preferred alternative, would allow for a mix of transportation modes and would emphasize collaboration with the gateway community of Tusayan. Alternative B would fulfill criterion 1 by providing new visitor vehicle parking in the park, while also encouraging visitors to leave their vehicles outside the park and use the new shuttle bus system for access. Improvements to visitor access under alternative B, as well as alternatives C and D, would reduce current resource impacts occurring from the lack of parking and congestion at key visitor destinations, thereby improving the long-term stewardship of the park's resources. Alternative B would have a greater area of disturbance of park lands, and thus park resources, than alternative C. Alternative B would result in the removal of a larger number of trees in the Canyon View Information Plaza area and would potentially impact a known archeological site and a special status plant species. Alternative B would allow the National Park Service flexibility in its approach to entry and parking management after monitoring the transportation conditions within the park. This would allow the agency to respond more readily to potential resource degradation associated with visitor movements and transportation. Some area of disturbance on national forest system land could occur under alternative B, but this would only happen if the

National Park Service determined through an adaptive management program that it was necessary to support the new shuttle bus service between the park and Tusayan.

Alternative C would meet criterion 1 as it would minimize the areas of soil disturbance and new construction within the park, as well as within the total project area. Less vegetation would be removed, and there would be fewer impacts to cultural resources than under the other alternatives. Minimizing development within the park while alleviating vehicular congestion would assist the National Park Service in properly managing the natural and cultural resources of this world heritage site for future generations. In comparison to alternative B, a greater area of disturbance on national forest system land would take place under alternative C, as some level of development would occur at Tusayan in the initial stages of implementation.

Alternative D would call for the concentration of new transportation facilities completely within the park. Although alternative D would partially fulfill criterion 1, it would result in the highest vehicular demand at the South Entrance Station and the greatest level of disturbance at Canyon View Information Plaza to accommodate needed parking. As a result, alternative D would have the least impacts on national forest system lands as there would be no development on these lands.

***Criterion 2 — Ensure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings.***

The no-action alternative would not fully meet criterion 2. Under this alternative park staff and visitors would access the South Rim by the same mix of travel modes, primarily through the South Entrance Station. No new parking or other substantial improvements would be provided near Canyon View Information Plaza, resulting in continued overcrowding and parking along roadsides. Existing and increasing congestion, visitor confusion and frustration with getting to key destinations, improper roadside parking, and safety risks

where parking is insufficient would continue, which would not contribute to safe and aesthetically pleasing surroundings.

Under alternative B the mix of travel modes would improve movement and safety by providing more parking and shuttle bus services, and it would remove the unpleasing surroundings of vehicular congestion and overcrowding at Mather Point. The removal of the Mather Point parking lot and road would contribute to culturally and aesthetically pleasing surroundings, particularly for the visitor experience at the adjacent canyon rim. More new parking would be provided at Canyon View Information Plaza than under alternative C, which would not contribute to culturally and aesthetically pleasing surroundings in the immediate area. New parking could also be developed on national forest system lands near Tusayan, resulting in impacts to aesthetics in this localized area adjacent to commercially developed properties; however, new parking would be designed to visually blend in with the developed surroundings. Alternative B would meet criterion 2 to a similar degree as alternative C.

Criterion 2 would be fulfilled under alternative C because the fewest number of private vehicles would enter and park in the park, thereby reducing roadway congestion and the potential for vehicle and pedestrian accidents. Alternative C also would result in the greatest potential for aesthetic surroundings because the amount of new parking in the park would be less than half of what could potentially be constructed under alternative B. Similar to alternative B, the provision of more parking and shuttle bus services would reduce the unpleasing surroundings of vehicular congestion and overcrowding at Mather Point. However, the Mather Point parking lot would be retained, and there could be some congestion and noise that would affect the aesthetics of the immediate area. In comparison to alternative B, a much larger parking lot would be constructed on national forest system lands near Tusayan adjacent to existing commercial properties.

Alternative D would not meet criterion 2 as well in terms of providing aesthetically pleasing surroundings because the greatest concentration of vehicle parking would occur in the park at Canyon View Information Plaza. There would be improvements at the Mather Point overlook similar to alternative B to ensure a safe and pleasing surrounding compared to existing conditions. However, alternative D would generate the most private vehicle traffic on internal park roads, resulting in greater vehicular safety concerns than under alternatives B and C.

***Criterion 3 — Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.***

The no-action alternative would not meet criterion 3 because current risks to health and safety would continue and could increase with the projected increase in visitation. Park visitors would continue to be restricted in their use of the environment at Mather Point and Canyon View Information Plaza because no additional parking and access would be provided. Therefore, the unintended consequences of social trailing and informal roadside parking that cause damage to the park's resources would continue.

Alternative B would meet criterion 3 by attaining a wide range of beneficial uses of the environment without degradation through the provision of more options for visitors to experience the South Rim. Through the construction of new parking and the provision of shuttle bus service, visitors would be readily accommodated in the park and would have easy access to the Canyon View Information Plaza facilities for varying lengths of time, thus reducing the impacts resulting from the current lack of parking. Current visitor congestion and safety concerns would be remedied through proposed development, which would be designed to be visually compatible with existing development. In addition, alternative B would provide for and enhance a wide range of uses

of the environment, particularly at Canyon View Information Plaza and the Mather Point overlook. Alternative B would result in the greatest amount of net new disturbance and degradation of sensitive resources; however, through the use of adaptive management, alternative B would allow the National Park Service flexibility in planning for future transportation system improvements.

Alternative C would also fulfill criterion 3 and would attain a wide range of beneficial uses of the environment by providing options for visitors to experience the South Rim, concentrating most new transportation facilities outside the park and thereby minimizing development within the park and degradation of sensitive resources. Similar to alternative B, alternative C would accommodate a wide range of uses of the environment, particularly at Canyon View Information Plaza and the Mather Point overlook. By emphasizing shuttle bus service as the preferred mode for entering through the South Entrance Station and by locating a shuttle staging area outside the park near Tusayan, visitors who enter the park in their private vehicle might not be able to find parking at popular destinations, which could then result in a greater level of impact than alternatives B and D. However, alternative C would result in less total acreage of new disturbance and degradation of sensitive resources than alternative B.

Alternative D would not meet criterion 3 to the same degree as alternatives B and C in that it would not provide the widest range of beneficial uses of the environment, namely by not providing new shuttle bus service between the park and Tusayan. Alternative D would have the least amount of new disturbance, and there would be no new disturbance on national forest system lands. The greatest level of degradation of park resources would occur under alternative D because it would have the largest area of disturbance within the park. Alternative D, however, would not likely cause degradation of special status species or archeological sites near Canyon View Information Plaza.

***Criterion 4 — Preserve important historic, cultural, and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice.***

The no-action alternative would fulfill criterion 4 better than alternatives B, C, and D by keeping new ground disturbance to a minimum, thus better protecting cultural heritage locations and natural resources. However, natural resources along roadsides near Mather Point would likely continue to be impacted without the addition of new parking areas and increased visitation. No changes would be made to increase the variety of individual choice for visitors and the diversity of experiences as provided in the action alternatives.

Alternative B would mostly meet criterion 4. The area of disturbance would be slightly greater, and additional cultural and natural resources within the park could be disturbed by the amount and location of proposed construction under alternative B, compared to alternative C. Alternative B proposes parking areas north of Canyon View Information Plaza where there is a known archeological site and two populations of Tusayan flame-flower, a special status species within the park. However, compared to alternatives C and D, alternative B would provide the widest range of personal choice for park visitors. Alternative B would expand the options for visitors to enter and experience the park by providing new parking within the park, a new shuttle bus service, trail access from Tusayan, and improved tour bus access to the South Rim. Compared to alternative C, there would be less risk in visitors not being able to find parking at Canyon View Information Plaza.

Alternative C would fulfill criterion 4 because fewer natural and cultural resources would be disturbed than under alternatives B and D. Alternative C, though, would rely on visitors parking outside the park and using the shuttle bus service to enter the park. There would only be a limited number of short-term parking spaces at Canyon View Information

Plaza, which would consequently restrict visitors' choices in the length of their stays and the activities they pursued. With limited parking, some visitors arriving by private vehicle might not be able to find parking and would be forced to skip visiting the Canyon View Visitors Center and Mather Point and move on to other destinations in the park.

Alternative D would not meet criterion 4 as well as alternative B or C. Under alternative D, the area of new disturbance at Canyon View Information Plaza would be greater than under alternatives B and C, impacting slightly more natural resources as a result. There would be no disturbance of national forest system lands under this alternative. Visitors would not have the choice of leaving their vehicles outside the park and riding a shuttle bus into the park. Adequate long- and short-term parking would be provided at Canyon View Information Plaza so that visitors could choose to leave their vehicles there for the duration of their visit.

***Criterion 5 — Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.***

The no-action alternative would not adequately fulfill this criterion. While the existing transportation modes would continue to provide access to the park, without the provision of additional parking to meet demand and other improvements proposed under the action alternatives, there would be no advancement of the balance between population and resource use under the no-action alternative. In fact, because of the current and anticipated transportation conditions, there would be more pressure on resources within the park.

Alternative B would meet criterion 2 the best by providing a better balance between population and resource use with the addition of new parking and other improvements at Canyon View Information Plaza and the Mather Point overlook. New development would allow for a better accommodation of park visitors at



Canyon View Information Plaza, with additional visitor opportunities, an improved visitor experience, and less crowding and congestion at popular spots than the no-action alternative. Tour bus visitors would have direct access with a new drop-off near the rim. This would all contribute to standards of living and a wide sharing of life's amenities. In addition, some visitor parking would occur outside the park, and visitors would enter the park by multiple means of transportation, including a new shuttle bus service and by trail. Tusayan residents who use park services and amenities would be able to ride shuttle buses into the park.

Under alternative C criterion 5 would be fulfilled by providing a better balance between population and resource use similar to alternatives B and D. The provision of new parking within the park, a new shuttle bus service between the park and Tusayan, and other improvements similar to alternative B would also contribute to standards of living and a wide sharing of life's amenities. Alternative C would provide the least amount of new parking at Canyon View Information Plaza and would rely on a greater number of visitors arriving by shuttle bus than alternative B; if visitors arriving by private vehicle could not find parking at Canyon View Information Plaza, they might forgo visiting this important park amenity. Alternative C would provide the greatest opportunity for Tusayan residents to use the shuttle bus system because more frequent service would be provided and the season would extend beyond the summer months, thus potentially improving the standard of living for those in the community.

Alternative D would fulfill criterion 5, but not as well as alternatives B and C. This alternative would allow for a balance between population and resources; however, there would be more pressure on resources within the park under alternative D and the potential gateway community link provided by a new shuttle, as proposed under alternatives B and C, would not be realized.

***Criterion 6 — Enhance the quality of renewable resources and approaching the maximum attainable recycling of depletable resources.***

Criterion 6 would be partially fulfilled by the no-action alternative. Renewable resources, primarily vegetation, would be preserved to a greater degree under alternative A because there would be no new construction of roadways, parking lots, or facilities. However, without adequate and convenient parking and improvements to the shuttle bus system, fewer visitors would likely park their cars and take the shuttle bus under alternative A, thus using more fuel and depletable resources.

Alternative B would not fulfill criterion 6 to the same extent as alternative C. A slightly greater number of trees and vegetation would be lost under alternative B than under alternative D, and tree removal would occur both in the park as well as on national forest system lands. In addition, visitors would use more depletable resources in the form of fuel to drive into the park and to visit the various attractions.

Alternative C would allow greater protection of renewable resources, primarily trees and vegetation, thus meeting criterion 6. Compared to alternatives B and D fewer trees would be removed, but under this alternative a greater number of trees would be removed on national forest system lands than under alternative B. It is also assumed that less fuel would be used by individual visitors if they parked their cars in Tusayan and rode shuttle buses into the park instead of driving.

Alternative D would meet criterion 6 because it would result in the least area of new disturbance and slightly less damage to renewable resources, primarily vegetation, than would alternative B. However, a slightly greater number of trees would be removed at Canyon View Information Plaza than under alternative B, and no tree removal would occur on national forest system lands. However, under alternative D there would not be a new shuttle bus service between Tusayan and the park.

Therefore, a greater number of visitors would be arriving by private vehicle than under alternatives B and C, which would result in the use of more depletable resources in the form of fuel to drive into the park and to its various attractions than the other action alternatives.

**Summary**

In conclusion, alternatives B and C are very close in how they meet these criteria. The key differences between the two alternatives are that alternative C would disturb fewer natural

and cultural resources, but alternative B would provide a greater opportunity for achieving a wide range of beneficial uses of the environment, maintaining an environment that supports diversity and variety of individual choice, and achieving a balance between population and resource use. Thus, both alternatives B and C are considered the environmentally preferred alternatives.

A summary of the environmental consequences appears in Table 15 at the end of this chapter.

## MITIGATION MEASURES

To minimize resource impacts, the integral design features (i.e., mitigation measures) below are common to all action alternatives, would be followed during implementation, and are analyzed as part of the action alternatives. Any integral design features necessary for an individual alternative are listed in the description for that alternative. These mitigating measures were developed to lessen the adverse effects of an alternative, as well as the effects of foreseeable actions, and they have proven to be very effective in reducing environmental impacts on previous projects. Some mitigation measures may be repeated if they are applicable to more than one resource. If phasing was needed for components of the action alternatives, these measures would apply whenever a particular project or phase was implemented.

### CONTRACTOR ORIENTATION

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Contractors working in the park would be oriented about proper conduct. This orientation would be provided both in writing and verbally at a preconstruction meeting. This policy would continue for this project. Orientation would include, but not be limited to:

- Wildlife should not be approached or fed.
- Collecting any park resources, including plants, animals, and historic or pre-historic materials, is prohibited.
- The contractor must have a safety policy and a vehicle fuel spill and leakage policy in place.
- Other environmental concerns and requirements discussed elsewhere in this document would be addressed, including the relevant mitigation measures listed below.

### LIMITATION OF AREA AFFECTED

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The following mitigation measures would be implemented to minimize the area affected by construction activities and to minimize the potential for adverse impacts due to connected actions:

- Staging areas for the construction office (a trailer), construction equipment, and material storage would either be located in previously disturbed areas near project sites (such as at existing parking areas) or in other disturbed areas that best meet project needs and minimize new ground disturbance. All staging areas would be returned to pre-construction conditions or better once construction had been completed. Standards for this, and methods for determining when the standards were met, would be developed in consultation with the park's vegetation program manager.
- Construction zones would be fenced with construction tape, snow fencing, or similar material before construction activity began. Fencing would define the construction zone and confine activity to the minimum construction area required. All protection measures would be clearly stated in construction specifications, and workers would be instructed to avoid conducting activities beyond the construction zone as defined by fencing.

### GENERAL CONSTRUCTION

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The following mitigation measures would apply to general construction activities:

- Proposed actions could be constructed adjacent to or within the same footprint as existing visitor facilities and services, and these projects could be implemented at the same time or in separate

phases. Once the park has identified a scope of work for a particular project phase, staff would work with the contractor(s) to develop a construction management plan for each phase to carefully sequence construction activities to minimize disruption to existing visitor facilities and services.

- Before construction, the contractor(s) for individual projects would work with park staff to develop a construction traffic management plan. The plan would include information on construction phases and duration, traffic scheduling, proposed haul routes, staging area management, visitor safety, detour routes, and pedestrian and bicyclist movements on adjacent routes. The National Park Service would limit the transport of debris, construction equipment, and materials to periods of off-peak traffic whenever possible.
- In collaboration with the shuttle bus service operator, if needed, park staff would develop a temporary shuttle bus service routing plan for use during construction. The temporary routing plan would take into account construction phasing, anticipated road closures and detours, construction of new or temporary shuttle bus stops, and any other necessary service changes. The areas selected for use as substitute shuttle bus and tour bus routes during construction would be reviewed by park staff before implementation to verify that any potential impacts to resources and existing park operations would be minimized. This would primarily occur at Canyon View Information Plaza.

## **CULTURAL RESOURCES**

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A memorandum of agreement between the National Park Service, the Arizona state Historic Preservation Office, and any interested tribes would be prepared to outline the terms and conditions agreed upon to mitigate

adverse effects to one known archeological site in the Canyon View Information Plaza project area. As part of this agreement, the National Park Service would also outline provisions for review and comment by the State Historic Preservation Office on design details as they are developed for Mather Point and the Grand Canyon Railway / parking lot D area. The National Park Service shall ensure that all terms and conditions as outlined in the memorandum of agreement are implemented as part of this project.

## **Archeological Resources**

To minimize construction impacts on archeological resources, the following mitigation measures would be incorporated into the action alternatives:

- If previously unknown archeological resources were discovered during the project, a park or Forest Service archeologist would be contacted immediately (depending upon if the discovery was on park land or national forest system land). All work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed, if necessary, in consultation with the Arizona State Historic Preservation Office and the affiliated tribes. If the site would be adversely affected, a treatment plan would also be prepared as needed. Treatment plans would fully evaluate avoidance, project redesign, and data recovery alternatives.
- All workers would be informed of appropriate site etiquette and the penalties of illegally collecting artifacts or of intentionally damaging any archeological or historic property. Workers would also be informed of correct procedures if previously unknown resources were uncovered during construction activities.

- The National Park Service would ensure that ground-disturbing activities in the vicinity of recorded archeological resources would be monitored. Monitoring could be accomplished by appropriate cultural resource specialists and/or tribal representatives.
- Given the likelihood of buried historic archeological sites in the area proposed for modifications in and around lot D, an archeologist would monitor ground-disturbing activities in this area.
- Several archeological sites exist adjacent to the proposed improvements at Canyon View Information Plaza. The proposed roadway and parking areas would be designed to avoid direct impacts to these known resources wherever possible. The National Park Service would conduct pre-construction work such as surface inventories and detailed documentation of sites before any ground-disturbing activities. As part of the design development phase, the known sites would be surveyed by an archeologist, and boundaries would be flagged and mapped so that the proposed areas of disturbance for construction would avoid these areas. Before construction, existing known archeological sites and sensitive areas within 10 meters of road construction activities would be flagged and protected with a drift fence, or a similar barrier, for protection during the construction period.
- It would not be possible to avoid one known archeological site near Canyon View Information Plaza and Mather Point during proposed construction activities under the preferred alternative. This site would be mitigated as part of this project and would be the subject of a memorandum of agreement, as mentioned above. The National Park Service would prepare and implement a treatment plan to guide archeological treatment and data recovery at this site. The treatment plan would be consistent with the Secretary of the Interior's Standards and Guidelines for Archeological Documentation.
- Staging areas for construction equipment and materials storage would be in designated areas where there is no potential for archeological resource disturbance. If the sites selected for these activities changed during later design phases for any alternative, additional archeological surveys would be conducted to ensure that the staging areas are clear of archeological resources.
- There might be some sensitive areas where archeological resources could occur on or near the surface. In such cases, contractors would be directed to not drag cut vegetation or use rakes, and to avoid using surface scarification to retard runoff into archeological sites.
- Erosion would be minimized to the extent possible, by designing paved or hardened surfaces to direct water flows away from sensitive areas. Existing roads and paved surfaces would be used as much as possible for construction activities and for keeping heavy equipment off undesignated paths and trails.
- Known archeological sites that could be directly or indirectly impacted by construction or use of an area, social trailing, and erosion would be monitored by the NPS staff. Pre-construction activities would consist of, at a minimum, photo-documentation and written descriptions of the sites, surface inventories, and detailed documentation as needed. In the event that impacts are observed, park cultural resource staff would identify mitigating measures to reduce adverse resource impacts caused by park visitors. Mitigation measures might include a data recovery plan or preventive measures such as temporary area closures, protective barriers, and informational signs. Post-construction monitoring of the sites would also be

conducted regularly, as determined by park cultural resources staff.

### **Historic Structures and Historic Districts/Cultural Landscapes**

To minimize impacts on historic structures and historic districts/cultural landscapes, the following mitigation measures would be incorporated into the action alternatives. Any additional mitigation measures developed during consultation with the state historic preservation officer would be adhered to.

- The rehabilitation of Mather Point would be in keeping with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1996b). New materials would be carefully evaluated to ensure compatibility and appropriateness with the setting.
- The rehabilitation of historic features or the introduction of any new features in Grand Canyon Village National Historic Landmark District (Grand Canyon Railway and the lot D area) would be consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties, including Guidelines for the Treatment of Historic Landscapes*. Consideration would also be given to the treatment recommendations of the 2004 *Cultural Landscape Report* (NPS 2004a) for this area.

### **Ethnographic Resources**

To minimize potential impacts to ethnographic resources, the following mitigation measures would be incorporated into the action alternatives:

- Specific or culturally or ethnographically sensitive areas identified by the tribes would be avoided.
- Through consultation, the NPS managers would consider associated groups' treatment preferences for ethnographically significant resources.

- The project would include design elements to prevent visitors from wandering off designated roads and trails to reduce potential impacts to unknown ethnographic sites.
- If Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony are uncovered during construction, all work would cease immediately, and the tribes would be contacted per the "Grand Canyon National Park Memorandum of Agreement" regarding inadvertent discoveries covered by the Native American Graves Protection and Repatriation Act.

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## **NATURAL RESOURCES**

### **Vegetation**

To minimize vegetation impacts, prevent nonnative vegetation introduction, and minimize the spread of noxious weeds, the following mitigation measures would be incorporated into the action alternatives:

- Inventories for existing populations of nonnative species would occur in all project and staging areas and would be treated before construction, as deemed necessary by the park's vegetation program manager. As design plans develop, they would be cross-referenced with existing vegetation survey information to ensure that no new survey is necessary before work starts.
- Vegetation program staff at the park would provide input on salvage potential and tree avoidance at project sites where necessary. A supervisory biologist would also spot-check work in progress.
- All construction equipment that would leave the road (e.g., bulldozers and backhoes) would be pressure-washed before entering the park. The location selected for vehicle washing, in addition to that selected for the batch plant,

- would be approved by a supervisory biologist.
- Staging area locations for construction equipment would be park approved, and the need to treat for nonnative vegetation would be considered.
  - Vehicle parking would be limited to existing roads or the staging areas.
  - Pruning necessary for this project and for any future periodic maintenance adjacent to overlooks and trails would adhere to the park's tree-pruning guidelines with the goal of retaining the health and integrity of trees and shrubs treated. Damage to trees or roots in or adjacent to project areas during construction would be avoided to the greatest extent practicable.
  - Any fill, rock, or additional topsoil needed would be obtained from a park-approved source. Topsoil from the project area would be retained whenever feasible.
  - A revegetation plan would be developed by the park's vegetation program manager in consultation with a landscape architect. Any revegetation efforts would use site-adapted native species and/or site-adapted native seed, and park policies regarding revegetation and site restoration would be incorporated. The plan would consider, among other things, use of native species, plant salvage potential, nonnative vegetation management, and pedestrian barriers. Policies related to revegetation would be referenced from *NPS Management Policies 2006* (NPS 2006d, chap. 9).
  - All areas disturbed by construction would be revegetated using site-adapted native seed and/or plants. Disturbed areas would be mulched and seeded with native plant seed to minimize the potential for nonnative annual plant invasion.
  - Nonnative species encroachment and distribution would be monitored for two to three years after construction.
  - Revegetation efforts would be initiated as soon as possible following construction to minimize the competition of native species with nonnative species.
  - Revegetation and vegetation management would follow recommendations of the Arizona Cooperative Extension Forest Health Working Group and the Arizona Bark Beetle Task Force (DeGomez 2007).
  - The impact of tree removal would be minimized by salvaging as many suitable trees as possible for use in revegetating disturbed areas in each project area following construction and other disturbed areas throughout the park (including areas needed to minimize social trailing), and by minimizing the width of vegetation removal along the road and Greenway Trail corridors as much as practical. Salvage would be limited to small trees and would not constitute a one-to-one tree loss because of slow growth patterns.
  - The National Park Service would provide visitors with educational and advisory materials about driving vehicles from areas that have nonnative species infestations outside the park and bringing these species into contact with areas that have little to no current nonnative species infestations inside the park.
  - To prevent impacts to cryptobiotic soils, to the extent possible, project elements should be located in areas that lack such soils.
  - If at all possible, deer goldenbush plants would be protected with construction fencing during construction. If destruction was not avoidable, the park's vegetation staff would develop protocols and plans for the propagation of this species and identify locations in Mather

Point and Canyon Valley Information Plaza islands where nursery-grown plants could be planted and interpreted for visitors.

## **Wildlife**

To minimize impacts to wildlife in the project area, the following mitigation measures would be incorporated into the action alternatives:

- To minimize effects on wildlife, construction activities would be restricted to daylight hours, from dawn to dusk.
- Construction and staging in areas of unique or ecologically important wildlife habitat would be avoided or minimized. This would include riparian ecosystems, assemblages of structurally diverse vegetation, mature tree stands, known denning/calving areas, wildlife movement corridors, and habitat known to be significant for foraging.
- Nonnative species encroachment and distribution would be monitored for two to three years after construction. For birds, this could include monitoring of edge species, such as the brown-headed cowbird, which is a known nest parasite on interior species.
- Revegetation efforts would be initiated as soon as possible after construction to minimize the competition between native species and nonnative species.

## **Special Status Species**

To protect any unknown or undiscovered threatened, endangered, or special status species, the construction contract(s) would include provisions for the discovery of such species. These provisions would require cessation of construction activities until park staff evaluated the impact, and they would allow contract modification for any measures determined necessary to protect the discovery. Mitigation measures for known special status species are as follows:

### ***Mexican Spotted Owl***

- Surveys would continue annually at the Mexican spotted owl protected activity center in the vicinity of Yaki Point and Grand Canyon Village. These surveys would maintain the best available data during the planning and implementation phases for this project.
- If construction occurred outside the protected activity center but within 0.5 mile of a known nest or roost site, or the boundary of a protected activity center where the nest or roost site was not known, or unsurveyed, restricted, protected, or predicted owl habitat, then light and heavy construction activity, as defined in the 2002 “Biological Assessment for the Parkwide Construction Program” (NPS 2002a) would be restricted to the non-breeding season between September 1 and February 28.

### ***California Condor***

- Before construction park staff would contact personnel monitoring California condor locations and movement to determine the species’ status in or near the project.
- If a condor occurred at the construction site, construction would cease until it left on its own or until permitted personnel used appropriate techniques to encourage the condor to leave.
- Construction workers and supervisors would be instructed to avoid interaction with condors and to contact the appropriate park or Peregrine Fund personnel immediately if and when condor(s) occurred at a construction site.
- The construction site would be cleaned up at the end of each work day (i.e., trash disposed of, scrap materials picked up) to minimize the likelihood of condors visiting the site. Park condor staff would complete a site visit to ensure adequate cleanup measures.



- To prevent water contamination and potential condor poisoning, the park-approved vehicle fluid leakage and spill plan would be adhered to. This plan would be reviewed by the park biologist for adequacy in addressing condors.
- If condor nesting activity was substantiated within 0.5 mile of the project area, then light and heavy construction in the project area would be restricted during the active nesting season (generally February 1 to September 30). Dates for the nesting season could be modified based on the most current information, in consultation with the park biologist and the U.S. Fish and Wildlife Service.

#### ***Peregrine Falcon***

- Peregrine falcon breeding areas would be monitored throughout the project to determine if nesting success is positive despite disturbances.

#### ***Navajo Mexican Vole***

- Locate staging areas outside any occupied vole habitats.
- Because direct mortality is unlikely, sufficient habitat should be retained for displacement and recolonization by voles, and most occupied vole habitats should be buffered from construction.
- NPS staff would trap and relocate voles from areas of suitable habitat that would be disturbed.

#### ***Tusayan Flameflower***

- If at all possible, the Tusayan flameflower population (89 individuals have been surveyed) at Mather Point / Canyon View Information Plaza would be protected with barrier vegetation and fencing or rock walls. In cooperation with park interpretive staff, signs would be designed to interpret and share with visitors information about this plant, its

protection, and its importance to the park.

- If destruction was not avoidable, the park's vegetation program staff would develop protocols and plans for the salvage of this species and for monitoring and adaptive management. (These protocols would only be applicable to the population at Canyon View Information Plaza and Mather Point).
- Because the plant exists in areas of cryptobiotic soil crusts, the vegetation team would have to consult with an expert in the transplant of these crusts along with the plant to determine the best transplanting techniques.
- The vegetation team would identify locations in islands at Canyon View Information Plaza where plants could be transplanted and interpreted for visitors.
- The vegetation team would identify locations away from the Canyon View Information Plaza area where plants could be transplanted into areas with minimal visitor impact.
- The population at Tusayan could be avoided to the extent practical. If they cannot be avoided, the National Park Service would coordinate with the U.S. Forest Service on the extent to which salvage and replanting would be necessary at Tusayan.

### **Soundscapes**

To minimize impacts to soundscapes, the following mitigation measures would be implemented:

- Depending on time and funding, information regarding project implementation and other foreseeable future projects would be shared with the public through park publications and other means.
- Standard noise abatement measures would be implemented during con-

struction, including the following: scheduling construction to minimize impacts to adjacent noise-sensitive areas; using best available noise control techniques wherever feasible; using hydraulically or electrically powered impact tools when feasible; and locating temporary construction-related noise sources as far from sensitive uses as practicable.

- Standard noise abatement measures would also be implemented during long-term operations, including the following: scheduling park activities to minimize impacts to adjacent noise-sensitive uses; using best-available noise control techniques wherever feasible; and locating stationary noise sources as far from sensitive uses as possible.
- Construction vehicles would be properly maintained and equipped with exhaust mufflers that meet state standards.
- Construction equipment would not be left idling any longer than necessary for safety and mechanical reasons.
- Unless otherwise approved by the appropriate park staff, operations of heavy construction equipment would be restricted to dawn to dusk year-round. Trucks would be allowed to haul after dark to the dump area, used for staging, but no other hauling operations would be allowed after dark.
- Construction activities would be coordinated with construction activities in adjacent and nearby locations to minimize impacts to surrounding noise-sensitive uses.
- During project operation, noise from transit vehicles would be limited by applying the best-available, low-noise technologies and operating strategies.

## Water Resources

To minimize potential water resource impacts, the following mitigation measures would be incorporated on an as-needed basis into the action alternatives:

- The requirements for a stormwater pollution prevention plan would be addressed by the contractor during the construction contract and would meet all statutory National Park Service standards. All National Pollutant Discharge Elimination System requirements would be met.
- Standard erosion control measures, such as silt fences, sand bags or equivalent control methods, would be used to minimize any potential sediment delivery to ephemeral streams.
- The park hydrologist and engineer would be consulted on the specific size, location, and layout of any new culverts and piping to ensure that impacts would be minimized.
- In Tusayan all best management practices would be consistent with the state's *Erosion and Pollution Control Manual* (ADOT 2005). The manual outlines ADOT procedures for complying with water quality regulations and permits, provides a variety of best management practices, and guidance in the selection of appropriate practices.
- Before construction, a hazardous spill plan would be submitted, stating what actions would be taken in case of a spill. This plan would incorporate preventive measures to be implemented, such as the placement of refueling facilities, storage, and handling of hazardous materials, and notification procedures in case of a spill.
- Adverse effects of fuel spills would be minimized through the following:
  - Locate construction staging areas away from surface water features.

- Locate activities such as refueling well away from surface water features.
- Designate areas where refueling or construction vehicle and equipment maintenance would be performed and have containment devices such as temporary earth berms around these areas.
- Have absorbent pads available to clean up spills.
- Environmental filtration along roadway embankments would use appropriate vegetation and flatter open channels to slow runoff from the parking project, as well as other surface runoff within the watershed that would be intercepted by the detention structure.
- Treatments would mechanically separate the chemicals and sediments in the surface runoff from parking areas, and they could be located under the parking pavement or adjacent disturbed areas.
- Sedimentation basins that would be implemented in association with inlet structures found within the pavement or along the curb line. Sedimentation basins would allow gravity to separate the sedimentation and petroleum products from the surface water collected within the parking area. (As the water enters these basins, it is temporarily detained within a multiple chamber detention basin and is discharged to the retention area along the roadway embankment.) The intent would be to manage the outflows so that the discharge would be spread out and not be concentrated in any one area. This system would provide for both water quality and reduction of the peak-flow discharge.
- Appropriate stormwater detention/retention systems and controlled release methods would be incorporated into the design of the transportation facilities to ensure that the flows within these ephemeral streams would remain at, or as near to, pre-construction flows as possible. Detention/retention systems could include:
  - on-pavement detention
  - underground detention
  - storage between the roadway embankment and parking areas
  - surface storage within the parking area and landscaped islands
- Outfall structures would be included that release stored runoff back to the basin area at a rate that would not result in loss of topsoil, cause additional soil erosion, increase the peak runoff, or harm downstream vegetation.
- Where possible, social trails and informal parking areas would be rehabilitated and revegetated, which would slow runoff and allow for better infiltration of stormwater.

### Geography, Topography and Soils

To minimize soil erosion, the following mitigation measures would be incorporated into the action alternatives:

- Drainage filtration areas would be located away from karst/limestone subsurface areas to avoid increased dissolution.
- Standard erosion control measures such as silt fences, sand bags, or equivalent control methods would be used to minimize any potential soil erosion.
- Trenching operations would be by rock saw, backhoe, track hoe, Pionjar (portable, gas-powered drill), ditch digger and/or trencher, with excavated material side-cast for storage. After trenching was completed, bedding material would be placed and compacted in the trench bottom. Backfilling and compaction would begin immediately after trenching, and the trench surface would be returned to pre-construction contours.

All trenching restoration operations would follow guidelines approved by park staff. Compacted soils would be scarified, and original contours re-established. The park's vegetation program manager would be notified within five days of scarification in order to facilitate timely native plant seeding.

- A revegetation plan would be developed by the park's vegetation program manager in consultation with a landscape architect. Any revegetation efforts would use site-adapted native species and/or site-adapted native seed, and park policies regarding revegetation and site restoration would be incorporated. The plan would consider, among other things, use of native species, plant salvage potential, nonnative vegetation management, and pedestrian barriers. Policies related to revegetation would be referenced from the NPS *Management Policies 2006* (NPS 2006d, chap. 9).
- The amount of disturbed earth area would be minimized, and the duration of soil exposure to rainfall limited.
- Disturbed soil or soil stockpiles would be covered with jute matting, erosion netting, straw, or other suitable cover material.
- Best management practices for erosion and sediment control would be inspected on a regular basis and after each measurable rainfall to ensure that they were functioning properly. Best management practices would be maintained (repaired and cleaned) as necessary to ensure that they continued to function properly.
- The installation and removal of best management practices would be sequenced in relation to the scheduling of earth disturbance activities, including before, during, and after such activities.
- Before clearing and grading, the ground in the area to be cleared would be

clearly marked to minimize the amount of cleared area.

- Only those areas necessary for construction would be cleared and grubbed.

## Air Quality

To minimize impacts on air quality, the following mitigation measures would be implemented:

- To reduce entrainment of fine particles from hauling material, sufficient freeboard would be maintained, and loose material loads (aggregate, soils, etc.) would be covered with tarps.
- To reduce tailpipe emissions, construction equipment would not be left idling any longer than is necessary for safety and mechanical reasons.
- Signs would be posted to alert park visitors of the possibility of delays and would request that during any such delay, engines be turned off to eliminate motor vehicle emissions.
- A dust abatement program would be implemented. Standard dust abatement measures would include the following elements: using water sprinkling or other methods to stabilize soils; limiting equipment to the fenced project area to minimize soil disturbance and consequent dust generation; sweeping all paved roads, parking areas, and staging areas where required and necessary; covering haul trucks; employing speed limits on unpaved roads; and minimizing vegetation clearing and revegetation after construction has been completed. A dust palliative would be applied to temporary parking facilities provided at Canyon View Information Plaza before paving.
- Landscaping and revegetation would control long-term soil dust production. Mulch and plants would stabilize soil

and reduce wind speed/shear against the ground surface.

- The best-available clean fuel technology for transit vehicles would be used to minimize air quality emissions and considering the need for reliable, cost-effective transit service with adequate vehicle capacity.
- The park would continue to require buses to turn off their engines while parked.
- The use of the asphalt batch plant near Center Road and the South Entrance Road would meet all necessary permit requirements and environmental standards for this type of operation.

## Night Sky

To minimize impacts on the night sky, the following mitigation measures would be taken:

- Construction activities would occur only during daylight hours, from dawn to dusk so as to avoid the need for night work or night lighting.
- Lighting would only be provided where necessary for mobility or safety of visitors.
- Different use areas, such as tour bus parking and privately owned vehicle parking, would be zoned for lighting. This would provide maximum flexibility to minimize impacts from parking area lighting by enabling the park to not light areas that are not used at night.
- The minimum amount of light necessary would be used in each new developed area. Only target areas, such as parking lots, would be lit, and the illumination footprint would not be extended beyond the target. Trees and other light-absorbing elements would also be used in the landscape design to reduce impacts of lighting.
- Fully shielded fixtures with asymmetrical light throws would be used to minimize the number of bollards for path lighting; these would concentrate lighting on the horizontal surface to direct light only where needed. It is assumed that where illumination is necessary there would be no horizontal light spread beyond paved surfaces.
- Exterior lighting would be regulated by a timer or motion sensor that would pair the application of light to the intended need. Hours of lighting would be minimized. For example, lights would go out 15 minutes after the last shuttle bus departure. The most hours of lighting would occur in winter, whereas summer impacts would be minimal (two hours in lighted areas.) The use of timers in areas zoned for lighting would offer the opportunity for seasonal variations in natural light and fine-tune lighting.
- Effects associated with yellow-orange colored light high-pressure sodium (HPS) would be explored to comply with the park guidelines because it is more energy efficient, cost efficient, and has a dramatically lower adverse affect on human visibility of the night sky and many wildlife species.
- Effects associated with amber light-emitting diodes (LED) would be explored.
- Headlight glare would be minimized in the direction of the North Rim from the new section of roadway near Canyon View Information Plaza through road grading so that the uphill edge of the roadway would be in cut sections where it intersected with the South Entrance Road.
- Additional piñon pine and junipers would be planted along new and existing sections of the South Entrance Road to screen headlight glare.

## Visual and Scenic Resources

To minimize visual impacts, mitigation measures would include the following:

- New construction on national forest system land at Tusayan would be consistent with USFS guidelines and would be compatible with the *Tusayan Area Plan* (Coconino County 1997) so as to ensure visual compatibility with the area and the nearby park setting. Vegetative screening would be incorporated into the parking area designs so as to minimize the visual effects of new parking from the highway.
- For those alternatives that include new facility development in Tusayan, the National Park Service would prepare visual simulations or other visual aids during the schematic design phase to assist in studying and communicating to others the proposals. This effort would be coordinated with the U.S. Forest Service and the community of Tusayan.
- The construction of additional greenway trails would be consistent in design and treatment with the other existing segments of the park's greenway.
- New construction at the South Entrance Station, Canyon View Information Plaza, and the shuttle bus maintenance facility would be consistent with the 1994 *Grand Canyon National Park Architectural Character Guidelines* that were used to guide the design and development of existing structures at Canyon View Information Plaza. New construction would be designed to be compatible (including elements of massing, scale, materials, and color) with the existing modern structures and landscape features to ensure visual continuity and unity.
- Any new construction, including the introduction of new landscape elements into the Grand Canyon Village National Historic Landmark District or Mather Point, would be consistent with the *Secretary's Standards for the Treatment of Historic Properties* (NPS 1996b).
- Signs, kiosks, and site furnishings would be consistent with the park's design palette and guidelines for similar features found elsewhere in the park. These design elements would be sited so that they would not compete with important views and vistas and would be incorporated into the surrounding landscape.
- The type, style, and location of new roadside and parking barriers to be installed along the South Entrance Road and near the Yaki Point picnic area would be developed in consultation with appropriate park staff, including landscape architects and specialists in vegetation, transportation, and cultural resources. These features would be designed to be in keeping with the overall landscape character of the specific area.
- Construction activities would be coordinated with other projects to the greatest extent possible to minimize the visual intrusion of construction equipment and activity in visitor areas. During the peak visitor season, construction projects would be scheduled to minimize impacts to scenic areas and heavily used visitor areas.
- Before the construction of any new building (theater, bike rental facility, fee administration facility, or restrooms), a National Park Service design team composed of an architect, landscape architect, cultural resource specialist, maintenance staff representative, and other park staff as appropriate, would consider and evaluate location and design options for the specific project site.
- Design for new parking lots would limit the area of contiguous parking by breaking up the expanse into smaller parking pods, using large islands at least 40–50 feet wide with retained vegetation

between parking areas to lessen the visual impact of a large number of parking spaces or vehicles. During the site design phase, the National Park Service would study alternatives for minimizing changes to the existing topography and for managing runoff. To the extent possible, the design of parking clusters and roads would incorporate the use of native vegetation to aid in blending the new development into the existing landscape.

## **SOCIAL RESOURCES**

### **Visitor Access, Use, and Experience**

To minimize short-term, construction-related impacts on visitor experience and safety, the following actions would be taken:

- Develop and implement a visitor protection plan for park review and approval that:
  - would provide procedures for managing staging areas to restrict public access and maintain site safety
  - would ensure that visitors are safely and efficiently routed around construction areas
  - would outline measures to protect the safety of visitors by providing established and maintained walkways across the site, as well as barrier fencing along trails and paths
- To the extent practicable, work would be scheduled to avoid construction activity and construction-related delays during peak visitation times. No holiday or nighttime work would be allowed. Unless otherwise approved by the park, operation of heavy construction equipment would be restricted to dawn to dusk, year-round. Weekend work (Friday through Sunday) would not be allowed unless authorized by park staff overseeing the construction.
- As allowed by time and funding, information about this transportation project and other foreseeable future projects would be shared with the public through park publications (such as the *Guide*) and other appropriate means during construction periods. This could take the form of an informational brochure or flyer distributed at the gate and sent to those with reservations at park facilities, postings on the park's website, press releases, and other methods. The purpose would be to minimize the potential for negative impacts to visitor experience during project implementation and other planned projects during the same construction season.
- National Park Service employees, residents, and concessioners would be notified about project implementation and road delays or road closures, as appropriate.
- The contractor would provide a weekly construction schedule with daily updates to the National Park Service field supervisor to assist the park in managing visitation and park operations during construction.
- A traffic control plan would be developed in conjunction with the construction documents for use during the construction period(s) associated with roadway, entrance station, overlooks, and parking area improvements. The plan would be provided by the contractor to the park superintendent for review and approval before implementation. Traffic delays could be possible; however, emergency vehicle access would be provided immediately.
- Parking areas might have to be closed on a short-term basis on limited occasions. Such closures would be for the minimal time required to complete the work.
- To ensure continuity in the availability of visitor and tour bus parking and loading/unloading during implementation, new parking and drop-off areas

would be constructed and put into service before the demolition of existing parking areas. New parking could be constructed in phases, but demolition would be implemented after an equivalent number of replacement parking spaces had been constructed so as to avoid any net loss of parking at one time.

- If required, flaggers, signing, or other new technology, as appropriate, would be used to manage traffic around work areas.
- Continued vehicular and pedestrian access to visitor facilities would be provided during construction. Temporary pedestrian pathways would be provided as needed between key visitor destinations, such as Canyon View Information Plaza and Mather Point.
- To reduce noise impacts on visitors, construction sites would be temporarily off-limits to visitors.
- New public facilities and amenities would be accessible to people of all ages, backgrounds, and abilities. The goals of barrier-free accessibility would be met, with emphasis on affording visitors with disabilities the same experiences and opportunities as other visitors. Access improvements would conform to the requirements of “Architectural Barriers Act Accessibility Guidelines” (Architectural and Transportation Barriers Compliance Board 2007).

### **Gateway Communities and Adjacent Land Uses**

- To coordinate with gateway communities in relation to project implementation, the National Park Service would develop and maintain a constructive dialogue and outreach effort with public and private organizations and busi-

nesses, including state and local tourism and travel offices and establish positive and effective working relationships with park concessioners and others in the tourism industry to ensure a high quality of service to park visitors.

### **Park Operations and Management**

- The National Park Service would develop a monitoring program in advance of implementing the first phase of construction. The monitoring program would use conventional benchmarking tools to track progress and would be updated on a regular basis. It would be used to assess the plan’s effectiveness on an ongoing basis and to aid managers in making decisions as to when to implement subsequent phases of construction. The monitoring program would track the park’s success in meeting quantitative goals, such as parking occupancy in lots, the incidence of unauthorized/overflow parking, traffic volumes, the total accumulation of vehicles. It would also assess conformance with qualitative standards such as ease of access to key visitor destinations, and the popularity of new shuttle routes. If plan objectives were not being reached, park managers could then decide to implement other actions identified in this plan as part of future work phases.
- The National Park Service would actively manage tour bus and train passenger loading/unloading operations and would prepare a management plan for these operations in cooperation with the park concessioner.
- The National Park Service would enforce the prohibition against unauthorized off-road parking by using boulders or other barriers as appropriate.



## COMPARISON OF ALTERNATIVES AND PROJECT OBJECTIVES

The following tables show the comparison between the various alternatives.

- Table 13 displays components of the alternatives.
- Table 14 compares the ability of the alternatives to meet project objectives, which are listed in Chapter 1:
  - *Alternative A: No Action* — This alternative would not meet any of the 12 objectives. It would provide no reduction in vehicle traffic and would result in increases in traffic over time. Access to Canyon View Information Plaza would continue to be limited to shuttle buses, tour buses, and pedestrians coming from parking at or near Mather Point.
  - *Alternative B: Preferred Alternative* — This alternative would fully meet all project objectives. It would provide up to 900 new parking spaces at Canyon View Information Plaza and up to 400 new parking spaces near Tusayan for visitor use. Proposed parking would meet existing and future needs, assuming a 23% increase in visitation over the life of the plan. Parking would be convenient to most visitor use areas and would be accessible by shuttle bus.
  - *Alternative C: Tusayan Parking Emphasis* — This alternative would mostly meet project objectives. It would provide up to 400 new short-term parking spaces at Canyon View Information Plaza and up to 920 new parking spaces near Tusayan for

visitor use. Proposed parking would meet existing and future needs, assuming a 23% increase in visitation over the life of the plan. The alternative would only partially meet the objective to improve shuttle bus access throughout the South Rim. Users of the South Kaibab trailhead would not be able to park at Canyon View Information Plaza. Some visitors might not be able to find parking at Canyon View Information Plaza at peak times. Many visitors would need to park in Tusayan at locations distant from their desired destinations.

- *Alternative D: Canyon View Information Plaza Parking Emphasis* — This alternative would mostly meet project objectives. It would provide up to 1,190 new parking spaces at Canyon View Information Plaza for visitor use. Proposed parking would meet existing and future needs, assuming a 23% increase in visitation over the life of the plan. Parking would be very convenient to most visitor use areas and would be accessible by shuttle bus. This alternative would have a greater area of disturbance and new construction at Canyon View Information Plaza than the other alternatives.
- Table 15 summarizes the environmental consequences of each alternative.

**TABLE 13. SUMMARY OF ALTERNATIVE COMPONENTS**

<b>Component</b>	<b>Alternative A: No Action</b>	<b>Alternative B: Preferred Alternative</b>	<b>Alternative C: Tusayan Parking Emphasis</b>	<b>Alternative D: Canyon View Information Plaza Parking Emphasis</b>
<b>Overall Concept</b>	Continue current conditions and management programs. Make no substantial physical or operational changes beyond those underway or currently planned. (Serves as the baseline for comparing environmental consequences of action alternatives.)	Construct new visitor parking at Canyon View Information Plaza and initiate shuttle bus service to Tusayan, beginning with a pilot program. Improve South Rim shuttle bus service to enhance convenience and capacity. Emphasize collaboration with the Tusayan gateway community to meet peak-season visitor transportation needs by supplementing day parking spaces at Canyon View Information Plaza with spaces in Tusayan. Apply adaptive management to determine if pilot shuttle bus service should be retained or expanded and to determine when and how much additional parking is needed. If and when needed, provide parking at a new parking and shuttle bus facility on national forest system land north of Tusayan. Implement a coordinated program of visitor information and marketing strategies to encourage visitors to park in Tusayan or to use other available parking. Improve opportunities for tour bus visitors, provide needed tour bus parking and passenger loading, and accommodate future increases in Grand Canyon Railway service.	Minimize development in the park by concentrating parking and shuttle bus staging in Tusayan and on national forest system land north of Tusayan. Provide parking at Canyon View Information Plaza for use by short-term visitors and encourage visitors to park at existing lots in Grand Canyon Village. Provide shuttle bus service from Tusayan to Canyon View Information Plaza. Improve South Rim shuttle bus service to enhance convenience and capacity. Apply an adaptive management program similar to alternative B. Implement a coordinated program of visitor information and marketing strategies to encourage visitors to travel into and through the park on shuttle buses. Similar to alternative B, improve opportunities for tour bus visitors, provide needed tour bus parking and passenger loading, and accommodate future increases in Grand Canyon Railway service.	Simplify wayfinding and visitor orientation by providing all required new parking at Canyon View Information Plaza. Improve South Rim shuttle bus service to enhance convenience and capacity. Do not provide shuttle bus service between Tusayan and Canyon View Information Plaza or additional visitor parking in Tusayan. Apply an adaptive management program similar to alternative B. Improve opportunities for tour bus visitors, provide needed tour bus parking and passenger loading, and accommodate future increases in Grand Canyon Railway service, similar to alternative B.
<b>Canyon View Information Plaza and Mather Point</b>				
Canyon View Information Plaza	Continue current use of Canyon View Information Plaza.	Enhance the visitor and arrival experiences; alleviate congestion. Realign the South Entrance Road south and west of Canyon View Information Plaza and construct new parking. Provide access to the new parking area from the realigned road.	Same as alternative B.	Same as alternative B.
Canyon View Information Plaza Parking	Provide no visitor vehicle parking; maintain access only by shuttle bus or pathway.	Initially construct 600 visitor vehicle parking spaces for short- and long-term use; add 300 more spaces if needed in the future.	Construct 400 visitor vehicle parking spaces for short-term use.	Initially construct 790 visitor vehicle parking spaces for short- and long-term use; add 400 more spaces if needed in the future.

Table 13. Summary of Alternative Components

Component	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
Visitor Amenities		Construct a new theater and bike rental facility at Canyon View Information Plaza. Provide limited food items. Provide additional interpretive exhibits at Canyon View Information Plaza.	Same as alternative B.	Same as alternative B.
Tour Buses	Maintain 24 tour bus parking spaces.	Increase parking capacity to 40 spaces. Enhance pedestrian access to the rim, and provide new tour bus passenger drop-off and vault toilet.	Increase parking capacity to 40 spaces (same as alternative B). Retain passenger drop-off at the existing location.	Increase parking capacity to 40 spaces (same as alternatives B and C). Provide passenger drop-off at existing shuttle bus stop for access to Mather Point rim views and Canyon View Information Plaza.
Mather Point	Do not resolve traffic congestion or vehicle / pedestrian conflicts near Mather Point. Maintain the parking lot. Continue to allow roadside parking near Mather Point.	Improve overlook area to be fully accessible. Add visitor amenities such as seating, picnic tables. Conduct selective vista clearing along the rim. Provide a new canyon viewing area on the flat rock outcrop. Remove the parking lot and road, except provide a shuttle bus stop at the west end of the lot. Eliminate informal roadside parking.	Improve overlook area to be fully accessible (same as alternative B). Conduct selective vista clearing along the rim. Retain the parking lot, but convert to parking for persons with disabilities, a shuttle turnaround, and a new shuttle stop at the west end. Eliminate informal roadside parking.	Same as alternative B.
<b>Grand Canyon Village</b>				
Visitor Parking	Continue use of existing lots for day and overnight visitors – 1,190 spaces available for day visitors (including Mather Point lot but not including roadside parking). Implement no new parking management strategies.	Remove 111 parking spaces in lot D to allow railyard improvements. Continue use of existing lots for day and overnight visitors, with minor changes to lots and removal of visitor parking in lot D (total of 1,040 spaces in village available for day visitors). Implement parking management program for all lots. Improve existing parking areas by delineating spaces, change uses for portions of lots, and reduce/eliminate informal roadside parking.	Same as alternative B except retain the Mather Point parking lot.	Same as alternative B.
Tour Bus Operations and Parking	Make no changes to tour bus access or parking management. Provide no additional tour bus parking. Continue loading and unloading of up to six buses at Bright Angel Lodge. Continue use of various lots and informal loca-	Continue loading/unloading of up to six buses at Bright Angel Lodge. Allow up to 14 buses at one time to park in lot E. Accommodate nine overnight tour bus parking spaces at lot D. Implement tour bus management program.	Same as alternative B.	Same as alternative B.

Component	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
	tions for parking in village. Remove restrictions for 20–21 foot buses to park in standard vehicle spaces.			
Grand Canyon Railway	Continue passenger unloading on existing platform and tour bus loading near Village Loop Drive.	Improve tour bus access for rail passengers. Actively manage tour bus and train loading/unloading operations; provide roving staff to enforce policies during peak season. Allow the potential for tracks 5 and 6 to be opened, displacing parking from the west end of lot D. Create new access road and 9 bus loading/unloading spaces south of rail-yard and within the eastern portion of lot D.	Same as alternative B.	Same as alternative B.
<b>South Rim Shuttle Bus Service</b>	Continue operation of three shuttle bus routes in Grand Canyon Village and on Hermit Road. Continue the Hiker Express route to the South Kaibab trailhead.	Enhance existing South Rim shuttle bus service to improve rider convenience; increase capacity to address current overcrowding and to accommodate future visitation increases. Employ adaptive management strategies to monitor and refine shuttle bus service in future. Provide meeters/greeters at key stops to aid visitors during implementation of service improvements. Continue the Hiker Express route to the South Kaibab trailhead.	Same as alternative B.	Same as alternative B.
Village Route	Continue present route.	Streamline Village route and increase frequency. Provide service to Yavapai Observation Station in both directions on Village route. Construct two new shuttle bus stops near Park Headquarters/Market Plaza.	Same as alternative B.	Same as alternative B.
Hermits Rest Route	Provide new, smaller shuttle buses and increase frequency of service to maintain current capacity.	Increase service frequency on Hermits Rest route.	Same as alternative B.	Same as alternative B.
Kaibab Trail Route	Maintain the Kaibab Trail shuttle bus route from Canyon View Information Plaza.	Extend the Kaibab Trail route to Market Plaza, Mather Campground, and Trailer Village. Increase service frequency. Improve shuttle access,	Same as alternative B.	Same as alternative B.

Table 13. Summary of Alternative Components

Component	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
		with parking at Canyon View Information Plaza.		
Shuttle Bus Stops		Provide shuttle bus stops for the Tusayan to Canyon View Information Plaza route; improve stops for the Village and Kaibab Trail routes.	Same as alternative B.	Improve shuttle bus stops for the Village and the Kaibab Trail routes.
Maintenance Facility	Continue use of existing maintenance facility for shuttle bus servicing and storage.	Construct new shuttle bus maintenance facility adjacent to existing facility.	Same as alternative B.	Same as alternative B.
Roadways	Maintain existing roadways and retain current operation of roads.	Relocate South Entrance Road to the south and west of Canyon View Information Plaza and new parking lots. Close Old Village Loop Bypass Road to vehicular traffic and convert to trail. Install physical barriers to prevent roadside parking between Mather Point and Yavapai Observation Station and near Yaki Point picnic area.	Same as alternative B.	Same as alternative B.
Yaki Point	Continue private vehicle and commercial tour bus access restrictions. Provide new trail access by way of phase V of the Greenway Trail.	Continue private vehicle access restrictions. Stripe the parking lot to accommodate seven tour buses on a first-come, first-served basis. Provide new trail access by way of phase V of the Greenway Trail.	Same as alternative B.	Same as alternative B.
Yavapai Observation Station	Maintain the existing parking area and restrictions on commercial tour bus use.	Implement tour bus management strategies. Allow limited tour bus access November through February on a trial basis. Accommodate up to three buses at one time.	Same as alternative B.	Same as alternative B.
South Kaibab Trailhead	Continue private vehicle and commercial tour bus access restrictions.	Same as alternative A.	Same as alternative A.	Same as alternative A.
South Rim Trails and Greenway Trail Expansion	Complete phases III and V of the Greenway Trail from Canyon View Information Plaza to Yaki Point, and from South Kaibab trailhead to park boundary.	Complete phases III and V of the Greenway Trail from Canyon View Information Plaza to Yaki Point, from South Kaibab trailhead to park boundary, from park boundary to Tusayan. Construct connections from Greenway Trail to Canyon View Information Plaza. Provide connection from the east end of Village Loop Drive to Hermit Road along the new access road south of the railyard and on Old Village Bypass Road.	Same as alternative B.	Same as alternative B.

Component	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
<b>South Entrance Station</b>	Continue with five entry lanes and one exit lane. Continue to use three prefabricated kiosks. As planned, construct up to two additional northbound lanes on SR 64 from park boundary to south entrance and a bypass lane. Monitor operations at entrance station and adjust to maximize operational efficiency. Maintain fee collection administration in existing facilities elsewhere in park.	As planned, construct up to two additional northbound lanes on SR 64 and a bypass lane (same as alternative A). Construct an additional service lane to provide a total of six in-bound service lanes, if needed. (No additional service lane in initial phase of implementation.) Monitor success of stacked kiosks, refine to address changing volumes of traffic and types of transactions. If stacked kiosks provide adequate capacity, consider replacing with permanent kiosks. Construct new fee administration facility, access drive, and parking.	As planned, construct up to two additional northbound lanes on SR 64 and a bypass lane (same as alternative A). Monitor stacked kiosks (same as alternative B). Construct fee administration facility, access drive, and parking (same as alternative B).	As planned, construct up to two additional northbound lanes on SR 64 and a bypass lane (same as alternative A). Construct an additional service lane to provide a total of six in-bound service lanes, if needed. (No additional service lane in initial phase of implementation.) If needed, operate the bypass lane as a normal service lane during peak periods (for seven in-bound service lanes). Monitor stacked kiosks (same as alternative B). Construct fee administration facility, access drive, and parking (same as alternative B).
<b>Tusayan</b>	No modifications proposed.	Implement pilot shuttle bus service from Tusayan to Canyon View Information Plaza. Partner with businesses and other entities in Tusayan to encourage visitors to leave vehicles at lodging sites and ride shuttle buses into the park. If needed, construct a shuttle bus staging area, visitor amenities, and up to 400 new parking spaces in phases on national forest system land (no construction in initial phase). Expand shuttle bus service to Canyon View Information Plaza as needed to serve new Tusayan parking facility, if and when constructed. Provide information on parking in park; encourage parking in and near Tusayan when park lots filled.	Construct a shuttle bus staging and transfer area and up to 920 new parking spaces and visitor amenities on national forest system land in phases. Initially provide 265 parking spaces; if needed, add up to 655 more spaces. Implement shuttle bus service to Canyon View Information Plaza. Partner with businesses and other entities in Tusayan to encourage visitors to leave vehicles at lodging sites and ride shuttle buses into the park. Expand shuttle bus service to Canyon View Information Plaza over time to meet demand. Provide information on parking in park; encourage parking in and near Tusayan when park lots filled.	No modifications proposed.
<b>Transportation Operation Strategies</b>	Continue current programs to aid visitors in trip planning and facilitate traffic flow. Refine existing programs and media when possible, but no new initiatives implemented. Upgrade some traveler information systems on a case-by-case basis as funding becomes avail-	Implement broad range of interrelated management strategies to improve effectiveness of transportation facilities to: <ul style="list-style-type: none"> <li>•influence visitation patterns, encourage off-peak visitation</li> <li>•provide higher capacity, efficiency within existing facilities</li> <li>•improve integration of</li> </ul>	Same as alternative B.	Same as alternative B.

Table 13. Summary of Alternative Components

Component	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
	able; continue existing ITS applications and work with the Arizona Department of Transportation to make improvements. Continue and expand as possible coordination with partners and communities to encourage prepayment of entry fees and provide trip planning services.	systems; provide better connections between parking and transit. Specific strategies would include changes to: <ul style="list-style-type: none"> <li>•Parking management</li> <li>•traveler information/visitor outreach</li> <li>•offsite pass sales</li> <li>•traveler information and other ITS improvements</li> <li>•operations coordination and monitoring</li> <li>•orientation and way-finding.</li> </ul>		
<b>Adaptive Management</b>	Continue existing management strategies, with limited adaptive management and monitoring for transportation services such as shuttle bus service and operation of South Entrance Station.	Employ an adaptive management approach to meet plan objectives. Implement plan elements in phases, monitor results, and make adjustments as needed before next set of actions implemented. Allow each set of actions to be refined based on lessons learned from preceding phases.	Same as alternative B.	Same as alternative B.
<b>Implementation</b>	Continue current management with no substantial improvements.	Implement plan in phases, with the following initial projects: <ul style="list-style-type: none"> <li>•improvements at Canyon View Information Plaza and Mather Point; provide 600 parking spaces at Canyon View Information Plaza</li> <li>•enhancements to South Rim shuttle bus service</li> <li>•pilot shuttle bus service from Tusayan to Canyon View Information Plaza</li> </ul> Initiate transportation management strategies: Monitor and evaluate first phase. Implement final phases as needed for Tusayan, Canyon View Information Plaza, South Entrance Station, shuttle bus service.	Phased approach; with the following initial projects: <ul style="list-style-type: none"> <li>•most improvements at Canyon View Information Plaza (including 400 parking spaces) and Mather Point</li> <li>•enhancements to South Rim shuttle bus service</li> <li>•construction of 265 parking spaces north of Tusayan</li> <li>•shuttle bus service from Tusayan to Canyon View Information Plaza</li> </ul> Initiate transportation management strategies. Monitor and evaluate first phase. Implement final phases as needed for Tusayan, Canyon View Information Plaza, expanded shuttle bus service.	Phased approach, with the following initial projects: <ul style="list-style-type: none"> <li>•improvements at Canyon View Information Plaza (including 790 parking spaces) and Mather Point</li> <li>•enhancements to South Rim shuttle bus service</li> </ul> Focus on transportation management strategies. Monitor and evaluate first phase. Implement final phases as needed for Canyon View Information Plaza, South Entrance Station, and expanded shuttle bus service.
<b>Costs</b>				
•Gross Capital Costs				
Transportation Construction	None	\$32,346,000	\$28,493,000	\$25,411,000
Other Site Construction	None	\$4,093,000	\$4,093,000	\$4,093,000
Bus Capital Costs	None	\$6,160,000	\$8,800,000	\$3,520,000
•Annual Operating Costs				
Transportation Management	None	\$706,000	\$746,000	\$521,000

Component	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
Shuttle Bus Operations	Annual increase of \$759,000 for increased service frequency on Hermit's Rest route	\$2,577,000	\$3,491,000	\$1,841,000
Facility Maintenance	None	\$570,000	\$504,000	\$440,000

TABLE 14. HOW THE ALTERNATIVES MEET PLAN OBJECTIVES

Plan Objectives	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
<b>Improve private vehicle parking as needed to meet current and future visitor demand.</b>	<u>Does not meet objective:</u> Would provide no increase in private vehicle parking, continuing existing shortfall.	<u>Meets objective:</u> Would provide up to 900 new parking spaces at Canyon View Information Plaza and up to 400 new parking spaces near Tusayan for visitor use. Would meet existing and future parking needs assuming a 23% total increase in annual visitation by 2020. Convenient parking for most visitor use areas and accessible by shuttle bus.	<u>Mostly meets objective:</u> Would provide up to 400 new short-term parking spaces at Canyon View Information Plaza and up to 920 new parking spaces near Tusayan for visitor use. Would meet existing and future parking needs assuming a 23% total increase in annual visitation by 2020. Need for many visitors to park in Tusayan at locations distant from their desired destinations. Users of the South Kaibab Trail would not be able to park at Canyon View Information Plaza.	<u>Meets objective:</u> Would provide up to 1,190 new parking spaces at Canyon View Information Plaza for visitor use. Would meet existing and future parking needs assuming a 23% total increase in annual visitation by 2020. Convenient parking for most visitor use areas and accessible by shuttle bus.
<b>Sustain the improved visitor experience at the South Entrance Station by providing capacity to meet future increases in visitor, employee, resident and commercial traffic.</b>	<u>Does not meet objective:</u> Would provide no potential for increased capacity to serve future increases in visitation.	<u>Meets objective:</u> Would reduce traffic at South Entrance Station by providing optional visitor access by shuttle bus from existing parking in Tusayan and possibly new visitor parking near Tusayan. Would add a sixth service lane if needed to meet future demand.	<u>Meets objective:</u> Would reduce traffic at South Entrance Station by providing optional visitor access by shuttle bus from existing parking in Tusayan and a large amount of new visitor parking near Tusayan.	<u>Meets objective:</u> Would add a sixth service lane at the South Entrance Station if needed to meet future demand and would allow use of bypass lane as a service lane if needed.
<b>Reduce overall vehicle traffic in the Grand Canyon Village in 2020 by 15%–25% during peak periods.</b>	<u>Does not meet objective:</u> Would provide no reduction in vehicle traffic and would result in increases in traffic over time.	<u>Meets objective:</u> Would reduce visitor traffic traveling through Grand Canyon Village in 2020 by 31% compared to alternative A.	<u>Meets objective:</u> Would reduce visitor traffic traveling through Grand Canyon Village in 2020 by 29% compared to alternative A.	<u>Meets objective:</u> Would reduce visitor traffic traveling through Grand Canyon Village in 2020 by 31% compared to alternative A.
<b>Provide a variety of means to access the Canyon View Visitors Center to afford all visitors the opportunity to receive park orientation soon</b>	<u>Does not meet objective:</u> Would continue limited access to Canyon View Information Plaza by shuttle buses, tour buses, and on foot from parking at or near	<u>Meets objective:</u> Would make Canyon View Information Plaza accessible by private vehicle at up to 900 parking spaces, as well as tour bus and shuttle bus.	<u>Mostly meets objective:</u> Same as alternative B, but some visitors in private vehicles arriving at peak times might not find parking at Canyon View Informa-	<u>Mostly meets objective:</u> Same as alternative B, except that shuttle bus service would not be available from Tusayan. Up to 1,190 parking spaces provided.



Table 14. How the Alternatives Meet Plan Objectives

Plan Objectives	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
after their arrival.	Mather Point.	Would make shuttle bus access available from Tusayan as well as Grand Canyon Village. Would provide access to Canyon View Information Plaza on foot or bicycle from Tusayan and the park trail system through extensions of the Greenway Trail.	tion Plaza. Only 400 parking spaces provided and limited to short-term use.	
Improve and increase tour bus parking and access to the rim to better accommodate current and future demand.	<u>Does not meet objective:</u> Would continue limited tour bus access to Canyon View Information Plaza and Bright Angel Lodge; no change in the number of tour bus parking spaces.	<u>Meets objective:</u> would provide new tour bus access at Yaki Point, expanded tour bus parking at Canyon View Information Plaza, and passenger loading closer to the rim. Would increase tour bus parking in the Village Historic District area and would manage tour buses to maximize use of tour bus facilities. Provides limited off-season tour bus access to Yavapai Observation Station on a trial basis.	<u>Meets objective:</u> Same as alternative B, but would not provide tour bus drop-off as close to the rim at Canyon View Information Plaza.	<u>Meets objective:</u> Same as alternative C.
Restore areas damaged by improper vehicle parking and social trailing in non-designated areas such as at Mather Point; encourage best management practices to reduce or avoid resource damage.	<u>Does not meet objective:</u> Would continue roadside parking along South Entrance Road near Mather Point and along the access road to Yavapai Observation Station. Continued social trailing from informal roadside parking to the rim at Mather Point and to Canyon View Information Plaza, with no restoration.	<u>Meets objective:</u> Would eliminate roadside parking and social trailing by providing sufficient parking for day visitor vehicles in parking lots and design treatments to discourage roadside parking near Mather Point; would allow restoration of damaged areas. Best management practices and elements of sustainable design used at all new development to reduce or avoid resource damage.	<u>Meets objective:</u> Same as alternative B.	<u>Meets objective:</u> Same as alternative B.
Reduce safety risks due to conflicts among pedestrians, parked vehicles, and moving traffic near Mather Point.	<u>Does not meet objective:</u> Would continue safety risks due to pedestrians crossing through traffic on South Entrance Road at Mather Point and roadside parking and pedestrian use along the roadsides.	<u>Meets objective:</u> Would markedly reduce safety risks by removing through-traffic from the pedestrian route between Mather Point and Canyon View Information Plaza. Would eliminate roadside parking and associated uncontrolled pedestrian crossings of traffic and pedestrian movements between traffic and parked vehicles.	<u>Mostly meets objective:</u> Similar to alternative B except some traffic, parking, and circulation for visitors with disabilities at Mather Point parking lot would remain; continued pedestrian crossings through traffic at Mather Point parking area.	<u>Meets objective:</u> Same as alternative B.
Protect and enhance sensitive park resources through implementation of	<u>Not applicable:</u> No transportation facility improvements would be made.	<u>Mostly meets objective:</u> Would reduce current resource impacts occurring from the lack	<u>Meets objective:</u> Would reduce current resource impacts occurring from the lack	<u>Mostly meets objective:</u> Similar to alternative B except no direct impacts to

Plan Objectives	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
the transportation facility improvements.		of parking and congestion at key visitor destinations thereby improving the long-term stewardship of the park's resources. However, there would be direct impacts to one known archeological site and special status plant species at Canyon View Information Plaza.	of parking and congestion at key visitor destinations thereby improving the long-term stewardship of the park's resources. Would minimize areas of soil disturbance and new construction in the park and total project area. Would be fewer impacts to cultural resources than alternatives B and C.	archeological resources and would have greatest area of disturbance for new construction at Canyon View Information Plaza.
Provide visitors with enhanced opportunities to stage (or plan) their visit at Canyon View Information Plaza, including access to improved information about trip planning, park orientation, and travel mode choices and the ability to obtain basic (or limited) pre-packaged food and drinks.	<u>Does not meet objective:</u> Would not improve trip planning services at Canyon View Information Plaza, and continued difficult access to existing services for most visitors. No food items available at Canyon View Information Plaza.	<u>Meets objective:</u> Would allow all visitors to obtain trip planning information through enhanced access to Canyon View Information Plaza, as well as orientation and interpretive information; would allow visitors to obtain basic food items without having to travel to other destinations in Grand Canyon Village.	<u>Mostly meets objective:</u> Same as alternative B, but some visitors in private vehicles arriving at peak times might not find parking at Canyon View Information Plaza due to fewer parking spaces.	<u>Meets objective:</u> Same as alternative B.
Provide support facilities as needed to operate and manage the transportation system, including park fee collection operations at the South Entrance Station.	<u>Does not meet objective:</u> Would continue fee collection operations at scattered locations in Grand Canyon Village.	<u>Meets objective:</u> Would provide a fee collection administration facility near the South Entrance Station, improving security and efficiency of operations. Would provide for construction of a new shuttle bus maintenance and storage facility.	<u>Meets objective:</u> Same as alternative B.	<u>Meets objective:</u> Same as alternative B.
Improve shuttle bus access throughout the South Rim.	<u>Does not meet objective:</u> Would continue present shuttle bus service, with all visitors traveling to Yaki Point or South Kaibab trailhead having to board shuttle buses at Canyon View Information Plaza, where no parking would be provided. Continued overcrowding on shuttle buses, and indirect travel required on the Village route.	<u>Meets objective:</u> Increased ridership and access to South Rim because of more frequent service to address demand, changes to Village route to make it more efficient and serve visitor needs, improved access to Yaki Point and South Kaibab trailhead with parking at Canyon View Information Plaza available for trail users, and improved operational efficiency. Would also add new Canyon View Information Plaza to Tusayan shuttle bus route to bring visitors directly to the South Rim.	<u>Mostly meets objective:</u> Same as alternative B, except no parking available for users of the South Kaibab trailhead at Canyon View Information Plaza, making access to the shuttle bus route less convenient.	<u>Meets objective:</u> Similar to alternative B except that no shuttle bus service between Canyon View Information Plaza and Tusayan implemented.

Table 15. Summary of Environmental Consequences

Plan Objectives	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
Work with gateway communities to achieve mutual transportation goals.	<u>Does not meet objective:</u> No new collaborative programs or outreach into gateway communities beyond existing programs for things such as limited offsite pass sales and visitor information.	<u>Meets objective:</u> Would rely on NPS collaboration with Tusayan community in meeting peak-season visitor transportation needs by providing visitors a choice of parking in Tusayan (in existing lots or potential new staging area) and riding a shuttle bus into the park. Pilot shuttle bus service between Canyon View Information Plaza and Tusayan, with several stops in Tusayan.	<u>Meets objective:</u> Same as alternative B except regular shuttle bus service established immediately instead of a pilot program, with a new parking area near Tusayan constructed in the first phase. Also, longer period of operation for shuttle bus service (March through September).	<u>Mostly meets objective:</u> New transportation facilities concentrated within the park at Canyon View Information Plaza. No shuttle bus service to Tusayan. Some collaboration with gateway communities for visitor outreach, offsite pass sales, etc.

TABLE 15. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
<b>Cultural Resources</b>				
<b>Archeological Resources</b>	No direct or indirect impacts to known archeological resources. No cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short- and long-term, negligible to moderate, direct and indirect, adverse impacts to archeological resources. Impacts minimized through memorandum of agreement with state historic preservation officer and tribes and through design features and mitigation measures. Local, long-term, negligible to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short-and long-term, negligible to minor, adverse, indirect impacts. Impacts minimized through mitigation measures. Local, long-term, negligible to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short- and long-term, negligible to minor, adverse, indirect impacts. Impacts minimized through mitigation measures. Local, long-term, negligible to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.
<b>Historic Districts and Cultural Landscapes</b>	No impacts to historic structures and districts or cultural landscapes. No impairment of historic structures or park resources. No unacceptable impacts.	Local, long-term, minor, adverse impacts. Impacts minimized with mitigation measures. Local, long-term, minor to moderate, adverse and beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, minor, adverse impacts. Impacts minimized with mitigation measures. Local, long-term, minor to moderate, adverse and beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, minor, adverse impacts. Impacts minimized with mitigation measures. Local, long-term, minor to moderate, adverse and beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.
<b>Ethnographic Resources</b>	Local, long-term, negligible, adverse impacts. Local, long-term, moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, negligible to minor, adverse impacts. Local, long-term, moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, negligible, adverse impacts. Local, long-term, moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, minor, adverse impacts. Local, long-term, moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.

	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
<b>Natural Resources</b>				
<b>Vegetation</b>	Local, long-term, negligible to minor, adverse impacts to vegetation resources. Local, long-term, minor to moderate, adverse cumulative impacts, plus Local, long-term, moderate, beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, negligible to moderate, adverse impacts to vegetation at Canyon View Information Plaza / Mather Point, South Entrance Station, along Greenway Trail, in Grand Canyon Village, and in Tusayan. Local, long-term, negligible to minor, beneficial impacts at Canyon View Information Plaza / Mather Point. Local, long-term, minor to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short- and long-term, negligible to moderate, adverse impacts to vegetation resources at Canyon View Information Plaza / Mather Point, South Entrance Station, along Greenway Trail, in Grand Canyon Village, and in Tusayan. Local, long-term, negligible to minor, beneficial impacts at Canyon View Information Plaza / Mather Point. Local, long-term, minor to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short- and long-term, negligible to moderate, adverse impacts to vegetation at Canyon View Information Plaza / Mather Point, South Entrance Station, along Greenway Trail, and in Grand Canyon Village. Local, long-term, negligible to minor, beneficial impacts at Canyon View Information Plaza / Mather Point. Local, long-term, minor to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.
<b>Wildlife</b>	Long-term, negligible, adverse impacts to wildlife. Long-term, negligible to moderate, adverse and long-term, minor, beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, negligible to moderate, adverse impacts to the wildlife depending on the project site. Local, long-term, minor, beneficial impacts at Canyon View Information Plaza / Mather Point. Local, long-term, minor to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, negligible to moderate, adverse impacts to the wildlife. Local, long-term, negligible, beneficial impacts at Canyon View Information Plaza / Mather Point. Local, long-term, minor to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, long-term, negligible to moderate, adverse impacts to wildlife. Local, long-term, minor, beneficial impacts at Canyon View Information Plaza / Mather Point. No impacts at Tusayan. Local, long-term, minor to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.
<b>Special Status Species</b>	Local, long-term, negligible to minor, adverse impacts to special status species. Local, long-term, minor to moderate, adverse cumulative impacts, and local, long-term, minor, beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short- and long-term, negligible to moderate, adverse impacts. Local, Long-term, minor, beneficial impacts from removing section of South Entrance Road at Mather Point and more efficient traffic flow, especially at South Entrance Station. Possible local, minor to moderate, adverse impacts if any Tusayan flameflowers lost at Tusayan staging area. Local, long-term, minor to moderate, adverse cumulative impacts; and Local, long-term, minor, beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short- and long-term, negligible to moderate, adverse impacts. Local, long-term, minor, beneficial impacts from removing section of South Entrance Road at Mather Point and more efficient traffic flow, especially at South Entrance Station. Possible local, minor to moderate, adverse impacts if any Tusayan flameflowers lost at Tusayan staging area. Local, long-term, minor to moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short- and long-term, negligible to moderate, adverse impacts. Local, long-term, minor, beneficial impacts from removing section of South Entrance Road at Mather Point and more efficient traffic flow at South Entrance Station. Local, long-term, minor to moderate, adverse, cumulative impacts. No impairment of park resources. No unacceptable impacts.
<b>Soundscapes</b>	No short-term impacts from construction. Local, long-term, negligible to minor, adverse impacts.	Local, short-term, minor, adverse impacts from construction. Long-term, negligible to moderate,	Local, short-term, minor, adverse impacts from construction. Local, long-term, negligible to mod-	Local, short-term, minor, adverse impacts from construction. Local, long-term, negligible to

Table 15. Summary of Environmental Consequences

	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
	Local and regional, long-term, minor, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	beneficial and adverse impacts from transportation and visitor-related noise. Local and regional, long-term, moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.	erate, beneficial and adverse impacts from operations. Local and regional, long-term, moderate, adverse cumulative impacts. No impairment of park soundscapes. No unacceptable impacts.	moderate, beneficial and adverse impacts from operations. Local and regional, long-term, moderate, adverse cumulative impacts. No impairment of park resources. No unacceptable impacts.
<b>Visual/Scenic Resources</b>	Local, long-term, minor, adverse impacts from vehicular and pedestrian congestion at Mather Point and tour bus congestion at Grand Canyon Village. Local, long-term, negligible, beneficial impact from South Entrance Station improvements. Local, long-term, minor beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short-term, minor to moderate, adverse impacts from construction. Local, long-term, moderate, adverse impacts at Canyon View Information Plaza; moderate, beneficial impacts at Mather Point; minor, beneficial impacts at Grand Canyon Railway yard; and minor, adverse impacts at Tusayan and South Entrance Station. Local, long-term, negligible to minor, adverse impacts at other locations. Long-term adverse impacts lessened by revegetation efforts along disturbed edges and mitigation measures. Local, short-term, minor to moderate, adverse, cumulative impacts; local and regional, long-term, minor to moderate, beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Local, short-term, moderate, adverse impacts from construction. Local, long-term, minor, adverse impacts at Canyon View Information Plaza; minor, beneficial impacts at Mather Point, Grand Canyon Railway yard; minor, adverse impacts at South Entrance Station; and moderate, adverse impacts at Tusayan. Local, long-term, negligible to minor, adverse impacts at other locations. Regional, long-term, negligible, beneficial impacts at the North Rim. Impacts reduced if only the first phase of construction at Tusayan occurred, resulting in smaller parking area. Long-term impacts lessened by natural encroachment and revegetation efforts in disturbed areas and mitigation measures. Local, short-term, moderate, adverse, cumulative impacts; local and regional, long-term, minor to moderate, beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.	Short-term, moderate, adverse impacts from construction. Long-term, moderate, adverse impacts at Canyon View Information Plaza; moderate, beneficial impacts at Mather Point; minor, beneficial impacts at the Grand Canyon Railway and lot D area; and minor, adverse impacts at the South Entrance Station. Long-term, negligible to minor, adverse impacts at other locations; no new impacts in Tusayan. Regional, long-term negligible, beneficial impacts at the North Rim. Long-term adverse impacts lessened by revegetation efforts along disturbed edges and mitigation measures. Local, short-term, minor to moderate, adverse cumulative impacts; local and regional, long-term, minor to moderate, beneficial cumulative impacts. No impairment of park resources. No unacceptable impacts.
<b>Social Resources</b>				
<b>Transportation</b>	Local, long-term, moderate, adverse impacts to modes of access and traffic volumes due to a 20% increase in visitor traffic. Local, long-term, moderate, and adverse impacts to shuttle bus service due to increasing demand and no increase in shuttle bus capacity. Local, long-term, moderate, adverse impacts to parking conditions due to increased parking de-	Local, short-term, minor, adverse impacts to traffic flow, shuttle bus service, and parking during construction and could occur at each project site. Local, long-term, moderate, beneficial impacts to modes of access and traffic volumes from shifting a substantial amount of visitor travel from private vehicles to shuttle buses, from increases in shuttle bus	Local, short-term, minor, adverse impacts during construction. Local, long-term, moderate, beneficial impacts on modes of access and traffic volumes from shifting a substantial amount of visitor travel from private vehicles to shuttle buses. Local, long-term, moderate, beneficial impacts on shuttle bus service quality from improved service levels and visitor conven-	Local, short-term, minor, adverse impacts during construction. Local, long-term, moderate, beneficial impacts on modes of access and traffic volumes. No change in modes of travel to the park or traffic volumes through the South Entrance Station. Increased travel by shuttle bus and substantially reduced traffic volumes through Grand Canyon Village.

	<b>Alternative A: No Action</b>	<b>Alternative B: Preferred Alternative</b>	<b>Alternative C: Tusayan Parking Emphasis</b>	<b>Alternative D: Canyon View Information Plaza Parking Emphasis</b>
	mand over time with no accompanying increase in parking supply. Overall local, long-term, moderate, adverse impacts on transportation Local, long-term, moderate, adverse cumulative impacts.	service and more efficient routes, and from greatly expanded parking supply in locations reasonably convenient to popular visitor destinations. Overall, local, long-term, moderate, beneficial impacts on transportation. Local, short-term, minor, adverse cumulative impacts; local, long-term, moderate, beneficial cumulative impacts.	ience. Local, long-term, minor, beneficial impacts from additional parking, but a large portion of which outside the park and less convenient than in the park. Overall, local, long-term, moderate, beneficial impacts on transportation. Local, short-term, minor, adverse cumulative impacts; local, long-term, moderate, beneficial cumulative impacts.	Local, long-term, moderate, beneficial impacts from increased shuttle bus service, and from greatly expanded parking convenient for most visitors. Overall, local, long-term, moderate, beneficial impacts on transportation. Local, short-term, minor, adverse cumulative impacts during construction; local, long-term, moderate, beneficial cumulative impacts.
<b>Visitor Access, Use, and Experience</b>	No changes to the park's transportation system. Changes to how visitors travel to and through the park; ease of access to desired visitor experiences, park resources and destinations, interpretive and recreational opportunities; and visitor safety related primarily to increased visitation and congestion. Visitors arriving by private vehicle most affected because of continued chaotic and uncomfortable experience, characterized by frustration, crowding, and confusion. As a result, local, long-term, negligible to moderate, adverse impacts to visitor access, use, and experience. Local, long-term minor, adverse cumulative impacts.	Local, short-term, negligible to moderate, adverse impacts during construction. Improved access to desired visitor destinations, as well as increased accessibility to educational and interpretive opportunities. Benefits to visitors arriving by all modes of access, particularly visitors arriving in private vehicles and visitors to Mather Point. Local and regional, long-term, minor to moderate, beneficial impacts on visitor access depending on transportation mode. Local, short-term, minor to moderate, adverse; cumulative impacts during construction; local and regional, long-term, moderate beneficial cumulative impacts from operations.	Local, short-term, negligible to minor, adverse impacts during construction. Greater visitor satisfaction in many areas, including decreased congestion and wait times, and improved safety and universal access options, with benefits for visitors arriving by all modes of access (similar to alternative B), but to a lesser extent for visitors in private vehicles due to less parking at Canyon View Information Plaza. Local and regional, long-term, minor to moderate, beneficial impacts to visitor access, visitor use, and experience. Local, short-term, minor to moderate, adverse cumulative impacts during construction; local and regional, long-term, moderate beneficial cumulative impacts from operations.	Local, short-term, negligible to moderate, adverse impacts during construction. Improved ease of access to desired visitor experiences and destinations. Benefits to all visitors arriving by all modes of access (similar to alternative B), with most benefit for visitors arriving by private vehicle because of the most parking at Canyon View Information Plaza. Local, long-term, minor to moderate, beneficial impacts to visitor use and experience. Local, short-term, minor to moderate, adverse cumulative impacts during construction; local, long-term, moderate, beneficial impacts from operations.
<b>Socioeconomic Environment</b>	Local, long-term, negligible to minor, adverse impacts from increased visitation and related vehicle congestion at the South Entrance Station and within Grand Canyon Village, possibly influencing length of visitor stays. No adverse impacts on employment, housing, or economic output. Local, short-term, negligible, adverse cumulative impacts; local and regional, long-term, minor to moderate, beneficial cumulative impacts.	Local and regional, short-term, negligible, beneficial impacts to tourism from capital expenditures and construction activities, benefiting Tusayan and Coconino County; no impacts to housing; and local and regional, short-term, minor, beneficial impacts on employment and economic output. Local and regional, long-term, minor, beneficial impacts on tourism and economic output from transportation operations and minor to moderate,	Local and regional, short-term, negligible, beneficial impacts to tourism from capital expenditures and construction activities, benefiting Tusayan and Coconino County; no impacts to housing; and local and regional, short-term, minor, beneficial impacts for employment and economic output. Local and regional, long-term, minor, beneficial impacts on tourism and economic output from transportation operations, and minor to moderate, beneficial	Local and regional, short-term, negligible, beneficial impacts to tourism from capital expenditures and construction, benefiting Tusayan and Coconino County; no impacts to housing; and local and regional, short-term, minor, beneficial impacts on employment and economic output. Local and regional, long-term, minor, beneficial impacts on tourism and economic output from transportation operations; and long-term, and minor to moderate,

Table 15. Summary of Environmental Consequences

	Alternative A: No Action	Alternative B: Preferred Alternative	Alternative C: Tusayan Parking Emphasis	Alternative D: Canyon View Information Plaza Parking Emphasis
		beneficial impacts on employment; regional, long-term, minor, adverse impacts to housing. Local, long-term, minor, beneficial impacts to park employment and economic output from new services at Canyon View Information Plaza, but regional, long-term, minor, adverse impacts to housing. Potential local, long-term, minor, beneficial impacts to Cameron. Local, short- and long-term, minor to moderate, beneficial cumulative impacts.	impacts on employment; local and regional, long-term, minor, adverse impacts on housing. Local, long-term, minor, beneficial impacts to tourism and economic output, from new services at Canyon View Information Plaza, while regional, long-term, minor, adverse impacts to housing. Potential local, long-term, moderate, beneficial impacts to Cameron. Local and regional, short- and long-term, minor to moderate, beneficial cumulative impacts.	beneficial impacts on employment; local and regional, long-term, minor, adverse impacts to housing. Local, long-term, minor, beneficial impacts on park employment and economic output from new services at Canyon View Information Plaza, and long-term, minor, adverse impacts on housing. Potential local, long-term, minor, beneficial impacts to Cameron. Local and regional, short- and long-term, minor to moderate, beneficial cumulative impacts.
<b>Gateway Communities and Adjacent Land Uses</b>	Local, long-term, minor to moderate, adverse impacts on gateway communities because of traffic and lack of housing affecting quality of life. National Park Service actions inconsistent with adjacent land use plans. Local, long-term, negligible, adverse cumulative impacts.	Local, long-term, minor to moderate, beneficial impacts on gateway communities because of improved quality of life and consistency of NPS actions with adjacent land use plans. Local, short- and long-term, negligible to minor, adverse impacts from some limited traffic congestion and potential increases in rental housing rates. Local, long-term, minor, beneficial cumulative impacts.	Local, long-term, minor, beneficial impacts on gateway communities because of improved quality of life. Local, long-term, moderate, beneficial impacts because of consistency of NPS actions with adjacent land use plans. Local, short- and long-term, negligible to minor, adverse impacts from some limited traffic congestion and potential increases in rental housing rates. Local, long-term, minor, beneficial cumulative impacts.	Local, long-term, minor to moderate, beneficial impacts on gateway communities because of improved quality of life. Local, long-term, negligible to minor, adverse impacts because of inconsistency of NPS plans with area land use plans. Local, short- and long-term, negligible to minor, adverse impacts from some limited traffic congestion and potential increases in rental housing rates. Local, long-term, negligible, beneficial cumulative impacts.
<b>Park Operations and Management</b>	Local, long-term, minor, adverse impacts on park operations and management. Local, short-term negligible to minor, adverse cumulative impacts; and long-term, minor, beneficial cumulative impacts.	Local, short-term, moderate, adverse impacts during construction. Local, long-term, moderate, adverse and beneficial impacts from operations: adverse impacts from increased capital and operating costs; however, beneficial impacts from operational efficiencies, improved transportation programs, and enhanced visitor services and programs, particularly during peak visitation months. Local, short-term, moderate, adverse cumulative impacts; and local, long-term, moderate, beneficial cumulative impacts.	Local, short-term, moderate, adverse impacts during construction. Local, long-term, moderate, adverse and beneficial impacts from operations (similar to alternative B): adverse impacts from increased operating costs; however, beneficial impacts from improved park operations, an effective transportation management program, and a successful visitor experience. Local, short-term, moderate, adverse cumulative impacts; and local, long-term, moderate, beneficial cumulative impacts.	Local, short-term, moderate, adverse impacts during construction. Local, long-term, moderate, adverse and beneficial impacts from operations (similar to alternative B): an adverse impact because of increased operating costs; however, a beneficial impact from improved park operations, an effective transportation management program, and a successful visitor experience. Local, short-term, moderate, adverse cumulative impacts; and local, long-term, moderate, beneficial cumulative impacts.

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