

## 6. Visitor Safety and Roadway Experience

The purpose of this chapter of the Corridor Management Plan (CMP) is to address considerations associated with visitor safety and travel along Historic Route 66. This chapter focuses on the experience of traveling the iconic roadway across the Mojave Desert, both now and in its heyday, as affected by safety and maintenance considerations.

Any proposed modifications to historic Route 66 intended to increase safety should be done in a manner that will not detract from the overall quality of the travel experience. Considerations should include being able to get out of a car safely to enjoy roadside features and nearby landscapes. Any modifications should use context sensitive design strategies to preserve, maintain or enhance the character-defining features of the route.

This chapter builds on preservation issues and recommendations discussed in Chapter 4, Stewardship. That chapter focuses on the roadside and context. Here we focus on the roadway itself. In practice, however, roadway maintenance and stewardship strategies must be closely linked to ensure that the significant qualities of this historic travel route are maintained while ensuring a safe and enjoyable travel experience.

### PUBLIC OUTREACH RECOMMENDATIONS/ISSUES

Three primary recommendations and a number of related questions and issues concerning the roadway were identified in the public outreach effort conducted along the corridor between November 2013 and March, 2014. They are summarized below:

*Preserve and maintain character-defining features of the historic transportation route and roadway:*

- The County of San Bernardino is responsible for maintenance and repair of 128 timber trestle bridges/structures on National Trails Highway (one of which is on Ludlow Road, an original alignment west of Crucero Road). Timber trestle bridges were constructed during the period of time from 1929 to 1935 with a life expectancy of 50 years. Many are in need of repair or replacement
- If bridges are replaced, retain character-defining features for bridge elements (bridge parapet walls, approach rails, abutment walls, etc.)
- The road surface between Ludlow and Newberry Springs is in critical need of re-pavement. When doing future re-pavement

#### Roadway Goal:

*Increase safety of the travel route in a manner that is sensitive to its historic context*



Figure 154 Historic Route 66 near Amboy

work, preserve features associated with the historic roadway, especially its drainage features such as the “Whoop-di-dos” (dips) and berms that direct runoff towards the washes

- Old alignments now abandoned—how should they be preserved and interpreted?
- Use of chip seal is the most cost effective and preferred maintenance treatment. In response to bicycle users questions about chip seal use, the evaluation of aggregate size along with the County’s standard practice of applying a fog seal over the chip will provide a smoother surface for the bicycle users while providing the roadway preservation treatment

*Prioritize and phase bridge repair and replacement and roadway resurfacing needs and pursue funding for top priorities:*

- Designation of Historic Route 66 as an official emergency route could leverage additional funding for repairs and replacement of inadequate bridges
- There is some concern that such a designation as an official emergency route would imply the requirement to use a higher level of design standards and guidelines for bridge widths, parapet walls, approach rails and other design elements
- A follow up study is needed to determine issues related to designating Historic Route 66 as an official emergency route
- Ensure proper weight restriction postings are in place for enforcement requirements
- Phase repairs over time while maintaining access to communities and historic features of Historic Route 66 based upon priorities identified as part of San Bernardino County studies and plans
- Maintain adequate sight distances for desired pull-offs or wayside exhibits to safely tell the story of Historic Route 66

*Make it easier to find Historic Route 66 sites and attractions:*

- Consider additional signage and wayfinding tools to ensure that visitors can find various sites and attractions and get the needed safety information in advance of planning a trip or making on-the-road travel decisions
- Visitor information is needed regarding availability of services (gas, food, lodging, water, restrooms, medical, law enforcement etc.)
- Advisory information is needed (climatic conditions/weather, off-road conditions for side trips, etc.) for advance travel planning and spur of the moment decisions

## **PRESERVING AND MAINTAINING CHARACTER-DEFINING FEATURES**

Most alterations to the road and associated roadside elements (bridge modifications, alignment changes, intersection modifications,

shoulder work, drainage, lighting, signage and access provisions) will also alter the travel experience. The goal, with Historic Route 66, is to increase traffic safety, comfort and convenience in a manner sensitive to its historic context.

## 1. ENSURING THAT HISTORIC ROUTE 66 RESOURCES ARE ACCURATELY IDENTIFIED AND CONSIDERED IN FUTURE TRANSPORTATION AND LAND USE DECISION-MAKING

Vulnerable historic and archeological sites along Route 66 are not well-protected by standard Section 106 practices. Route 66 resources are not adequately inventoried and what is inventoried is found in multiple locations. A system is needed that can be easily accessed and utilized for project sponsors that identify Historic Route 66 resources so that local, state and federal governments have better access to this information when doing work within the identified Route 66 corridor. The following steps are recommended:

- 1.1 Establish a central repository for all Route 66 related resource inventories and seek funding in support of managing the inventory and monitoring Section 106 activities to ensure accurate information is considered
- 1.2 Transmit CMP-developed GIS data and inventory maps to the City of Needles, City of Barstow, San Bernardino County, CalTrans, and BLM to as an interim method to increase awareness of Historic Route 66 resources
- 1.3 Establish a method among regulatory agencies for adding new information to existing data bases and coordinating the delivery of that information to responsible agencies, utilizing the common data base transmitted and maintained in Strategies 1.1 and 1.2
- 1.4 Seek funding for more detailed resource inventories on an annual basis to support listing on state and national registers of historic places

## 2. USING CONTEXT SENSITIVE SOLUTIONS

Context sensitive solutions (CSS), as applied to historic roads, refers to a collaborative, interdisciplinary approach that involves all stakeholders to ensure that modifications to that historic road and corridor fit its setting. For historic roads, CSS provides the underlying rationale for applying alternative and more flexible approaches to transportation design and management. Flexible design approaches reflect the need to maintain the route's significant character-defining features while increasing safety. Chapters 3 and 4 document the significance of Historic Route 66's character-defining features. The following recommendations outline the CSS approach for future transportation-related modifications to the road:

- 2.1 Establish an appropriate process for communicating the rationale for preserving Historic Route 66 and its features to County and

### California State Historic Building Code

*"18961. All state agencies that enforce and administer approvals, variances, or appeals procedures or decisions affecting the preservation or safety of the historical aspects of qualified historical buildings or structures shall use the alternative provisions of this part and shall consult with the State Historical Building Safety Board to obtain its review prior to undertaking action or making decisions on variances or appeals that affect qualified historical buildings or structures."*

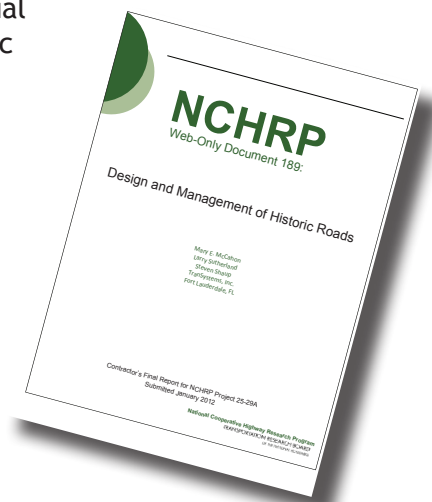


Figure 155 NCHRP Web-Only Document 189 "Design and Management of Historic Roads" provides useful guidance for addressing traffic and engineering issues on historic roads

### Special Concerns for Desert Travel

A large portion of Route 66 in the targeted corridor involves travel through the Mojave Desert. This sidebar lists important tips for a safe trip.

- Plan your trip: know where you are going; and how long it will take to get there.
- Never travel alone if possible and share travel plans with family and friends. Have a communication plan and check in often.
- Ensure vehicle is in good working condition. Always start with a full tank of gas. Fuel frequently and always try to maintain half a tank.
- Have a GPS unit, cellular phone, area map, compass, or a SPOT (Satellite Personal Observation Tracker).
- Pack food, snacks and at least one gallon of water per person per day.
- Pack emergency kit with a first aid kit, knife, signal mirror, flashlight, matches and a kite (as signaling devices to attract search and rescue teams).
- Plan for extreme desert temperatures.
- Have sunscreen, sunglasses and broad brimmed hat. Use frequently.
- Dress in layers for comfort at all temperatures.
- Don't panic! If you get stranded, make a large X on the ground using newspaper, rocks, or other bright/shiny material that does not match the natural surroundings.
- Watch for snakes, spiders, and scorpions among the rocks.
- ... and don't leave the vehicle. It is easier to see the vehicle than a person walking in the desert. Fly the kite if possible.

- State transportation agencies for both federally funded and non-federally funded projects and activities, including the economic values related to heritage- and nature-based tourism
- 2.2 Coordinate any proposed or planned maintenance with appropriate land management agency or office of jurisdiction to evaluate and minimize potential impact on adjacent public lands
  - 2.3 Consult the report *NCHRP (Web-only) 189 Design and Management of Historic Roads* for recommendations regarding design issues, terms, approaches and guidance for doing design work on historic roads
  - 2.4 Agree upon appropriate guidelines and engineering design standards that impact the geometric design, lane widths, crash-barrier design as well as the future operating speeds for the historic roadway
  - 2.5 Determine the nature of future truck use along Historic Route 66 to ascertain priorities for future bridge work and potential funding sources and select appropriate design criteria
  - 2.6 Determine the applicability of California's State Historical Building Code as a tool for historic preservation<sup>1</sup>:
    - If specific structures are identified as eligible, does the State Historic Building Code apply to work required to complete repair or replacement?
    - If the entire travel route is identified as eligible for the National Register, would the State Historic Building Code apply to "non-contributing structures"
  - 2.7 Adopt a historic treatment plan for Historic Route 66 through the Mojave Desert. At a minimum, the treatment plan should incorporate the following topics:
    - 1) Process and Approach
    - 2) Applicable Guidelines
    - 3) Discussion of Design Speed vs. Operational Speed
    - 4) Roadway Geometry - maintaining present alignment; preserving past alignments
    - 5) Pavement Resurfacing
    - 6) Drainage
    - 7) Structures
    - 8) Roadside Features and Elements
    - 9) Signage
    - 10) Accommodating Bicycles
    - 11) Travel Services

(See "Historic Preservation Treatment Plan" on page 126)

### 3. LEVERAGING HISTORIC SIGNIFICANCE TO FACILITATE MORE FUNDING OPTIONS

Historic Route 66 is both an important heritage-based touring route and the de facto emergency alternative route to I-40. CalTrans needs to either formally designate Historic Route 66 as an official

<sup>1</sup> See [http://www.dgs.ca.gov/dsa/AboutUs/shbsb/shbsb\\_health\\_safety.aspx](http://www.dgs.ca.gov/dsa/AboutUs/shbsb/shbsb_health_safety.aspx)



emergency alternate route, or they need to more aggressively limit overweight trucks from using the route when I-40 is closed. Official designation should bring with it increased priority for funding needed bridge repair or replacement and roadway resurfacing.

As documented in Chapter 3, Historic Route 66 is an international destination for heritage travelers. In enacting Public Law 106-45, the 106th Congress in 1999 voted unanimously to preserve the cultural resources of the Route 66 corridor and authorized the Secretary of the Interior to provide assistance. The following recommendations outline the steps needed to increase the range of funding options for needed roadway and bridge work on Historic Route 66.

- 3.1 Adopt, as part of the County of San Bernardino General Plan Update, a policy designating Historic Route 66 as a heritage tourism destination and, with CalTrans concurrence, confirm the de facto role as an emergency alternate route to I-40.
- 3.2 Develop and adopt a phased historic preservation treatment plan that will allow bridge and resurfacing work to occur on distinct segments, between interchanges, while keeping as much of the route as possible open for business and accessible to residents.
- 3.3 Coordinate any and all proposed or planned road/right-of-way improvements with appropriate land management agency/office of jurisdiction to review and avoid any potential impacts to adjacent public land resources (cultural, historic, pre-historic, botanical, wildlife, scenic, etc.)
- 3.4 Based upon 3.3, above, develop and adopt a programmatic environmental assessment for all identified 3R work (bridge repair and roadway resurfacing) in consultation with California SHPO and CalTrans, BLM and other federal and state agencies. The agreement must facilitate the necessary permitting for all necessary modifications identified in the treatment plan, allowing the work to be phased over time.
- 3.5 Seek funding from federal and non-federal sources to provide a means of financing road modifications through partnerships with heavy users of the route (BNSF railroad, resource extraction, utilities, renewable energy developers, etc.)

#### 4. FACILITATING BROADER RANGE OF TRAVEL MODES

There are multiple ways to travel Historic Route 66—by automobile, recreational vehicle, motorcycle, bicycle, on foot, or by passenger train. Currently, the vast majority of travel trips are by automobile, recreational vehicle or motorcycle. Increasing the choices and safety for those choosing to travel on foot, by bicycle or by public transportation will further enhance heritage tourism goals for the corridor. Linking public transportation together with travel itineraries for bicycle touring, bus touring, or car-sharing services



Figure 156 Heart of the Mojave trailhead located at the new BLM California Route 66 Gateway wayside

#### Potential Roadside Pull-off Locations at Associated Features

- Five Mile Road (BLM Kiosk completed)
- Needles<sup>1</sup> at Carty's Camp
- Needles at El Garces/ Park
- Needles at Texaco
- Klinefelter
- Goffs
- Fenner
- Essex
- Danby
- Cadiz Summit
- Chambless
- Roadrunner Café
- Amboy
- Bagdad
- Siberia
- Ludlow Main Street
- Route 66 wayside at Hector Road
- Newberry Springs Gas Station
- Newberry Springs Bagdad Cafe
- Daggett (Hotel/ Garage)
- Daggett (Seymour Alf)
- Daggett: Inspection Station
- Barstow Sante Fe Trail
- Barstow Railroad Yard

<sup>1</sup> Additional locations in Needles and Barstow will be interpreted as part of walking tours or as gateway sites (see Chapter 5)



Figure 157 Route 66 approaching Newberry Springs eastbound



Figure 158 View east from Danby Rest Area



Figure 159 Route 66 and Roadrunner Cafe site near Chambless



Figure 160 Route 66 and modern era "Rock Art" near Roadrunner Cafe site

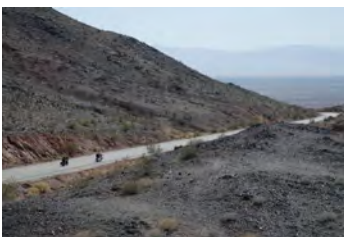


Figure 161 Long distance motorcycle travelers over Cadiz Summit

will enhance heritage tourism goals for Historic Route 66 (see page 158). The following recommendations outline steps needed to broaden the range of travel choices and increase the safety of travel.

- 4.1 Work with bicycling clubs and user groups to establish appropriate long-distance routes, support facilities, and safety protocols for long distance bicycle trips on Route 66. Incorporate context sensitive design guidelines for accommodating bicycle travel in a manner that is consistent with its historic significance.
- 4.2 Work with AMTRAK, County, and private transit companies in cooperation with primary Historic Route 66 destination staffs and hospitality providers to establish mass-transit itineraries, events and programming (see Chapter 7, Marketing).
- 4.3 Ensure that desert travel safety measures are printed on all collateral materials for itineraries and incorporated boldly on all web-based information (see sidebar, page 124, for travel safety tips utilized by BLM).
- 4.4 Develop and maintain up-to-date signage and visitor information kiosks regarding available services at exit points where I-40 and Historic Route 66 intersect.
- 4.5 Develop and maintain up-to-date route marking and wayfinding signage to ensure that travelers can follow the route and find points of interest and destinations.
- 4.6 Develop safe and accessible pull-offs at key features along the roadway including viewpoints, historical wayside exhibits, and recreational trailheads (see sidebar, page 125).

## HISTORIC PRESERVATION TREATMENT PLAN

Chapter 4 presents the need for historic treatment plans for individual or small groups of roadside features along Historic Route 66. This Chapter's discussion focuses on the roadway itself. The roadway requires a historic preservation treatment plan that addresses future modifications to bridges, repaving, drainage, signage, accommodating bicycle use and other related factors.

Fortunately, CalTrans, SHPO, FHWA, and the County of San Bernardino among others have maintained an ongoing partnership for the past three years to inventory historic resources associated with the 128 timber trestle bridges between I-40's Mountains Springs Road exit and Daggett. The results of this partnership have been an evaluation of the significance and the documentation of roadway related resources that are eligible for the National Register of Historic Places. Under this partnership effort, San Bernardino County has established context sensitive approaches to reconstructing two of the timber trestle bridges that are forming the basis for the needed Historic Preservation Treatment Plan.

## APPROACH

When county or municipal governments or CalTrans prepare to undertake roadway related work along Historic Route 66, they need to consider, at the outset of the project, historic significance and design elements of current and past alignments when making roadway safety or capacity changes. These considerations become the basis of an overall treatment plan which is especially important when considering the 128 timber trestle bridges—many of which are eligible for listing on the National Register of Historic Places.

Such a treatment plan should include: documentation of historic significance; documentation of travel history; and understanding of its character-defining features; a determination regarding appropriate treatments; agreement regarding purpose and need for proposed modifications; and compatibility with federal and state guidelines for appropriate modification. Each of these elements are detailed below:

### Document Historic Significance

The County of San Bernardino is undertaking work to ascertain historic significance and integrity of the timber trestle bridges. Route 66's alignment is considered eligible for listing on the National Register of Historic Places (see "National Register Eligible Determination" on page 45 and SHPO letter of November 25, 2014 in Appendix III) meaning that Section 106 of the National Historic Preservation Act applies to work funded directly or indirectly through federal sources. The Historic Property Survey Report, Archeological Survey Report and Historic Resources Evaluation Report prepared for California Highway 66/National Trails Highway (NTH) (P-36-002910, CA-SBR-2910H), the segment of California US Highway 66/NTH from Daggett to Mountain Springs Road Exit on I-40 provides extensive information about the cultural resources associated with the alignment.

Significance of the route and its features has also been well documented by other sources. National Old Trails Road/Route 66/ National Trails Highway (CA-SBR-2910H National Old Trails Road) has previously been determined to qualify as eligible for the National Register of Historic Places (National Register), and is also listed in the California Register of Historic Resources (CRHR) as documented in the following<sup>2</sup>:

*Matt Bischoff, 2005, Life in the Past Lane: The Route 66 Experience, Historic and Management Contexts for the Route 66 Corridor in California, Volume 1, Route 66 in the California Desert.* Note: Bischoff recommended preparation of a Multiple Property Document Form (MPDF) and indicated that Route 66

<sup>2</sup> Information provided by San Bernardino County as part of the ongoing work of their cultural resource consultant, Roger Hatheway (2014)



Figure 162 Timber trestle bridge at Avon Wash



Figure 163 View of bridge rail and abutment walls at Amboy bridge



Figure 164 Timber trestle bridge east of Danby Rest Area that still retains historic wood parapet rail with metal 'W'-beam approach rail attached

is eligible for the National Register under Criterion A and C and possibly B and D (portions). Bischoff also made the statement that all earlier U.S. Highway 66 and National Old Trails Road alignments are also eligible to the National Register.

*Carol Roland, 2011, National Register of Historic Places Multiple Property Documentation Form: U.S. Highway 66 in California, Mead & Hunt, September 28, 2011.* The MPDF suggests that a wide variety of properties may be eligible along California U.S. Highway 66 in association with Criteria A-D and Criterion G, based on individual evaluations. Note: The MPDF was approved by the State Historic Preservation Officer (SHPO), forwarded to the California State Historical Resources Commission (SHRC), and approved by the SHRC on October 28, 2011. The alignment appears to qualify under National Register OHP Status Code - 2CB.

### **Respect the Travel Experience**

Historic Route 66 is more than just a ribbon of pavement. Historic Route 66 is a travel experience that is enjoyed by visitors from all over the world, many of whom go from Chicago to Los Angeles. Historic Route 66 includes roadway features, adjoining historic sites, nearby attractions and views providing the setting for that travel experience. As noted on page 125, visitors travel by car, recreational vehicle, motorcycle, bicycle, on foot, by train or bus.

Within the study corridor's rural portion, west of Needles and east of Daggett, Historic Route 66 provides access to small rural communities, individual residences and businesses, numerous historic sites, maintenance vehicles from BNSF Railroad and other utilities, and those seeking recreational access to public lands managed by the BLM, NPS, and the State of California.

Traveling on Historic Route 66 for pleasure is worthwhile. Vehicle operating speeds vary. Some drivers are traveling at a leisurely pace and enjoying the experience, but are unfamiliar with the route and may be searching for hidden roadside features. Others are local drivers looking to get from one point to another as quickly as possible.

Historic Route 66 through the Mojave Desert has a low volume of traffic. Average Daily Traffic (ADT) is approximately 1000 vehicles per day near Daggett and decreases to less than 500 vehicles per day between Newberry Springs and Ludlow, and less than 400 between Ludlow and Amboy. Traffic volumes increase to approximately 500 ADT between Amboy and Essex. US Route 95 between Goffs Road and Interstate 40 carries between 2500 and 3250 ADT.



Statistics record very few crashes on the rural sections of Historic Route 66 (between Daggett and Needles) in comparison with other higher traffic volume roads, such as Interstate 40 or US Route 95.

### **Understand Character-defining Features**

Those designing roadway modifications on Historic Route 66 need to understand how its character-defining features—including roadway features, roadside features (such as associated structures and uses), and its views and context—contribute to the route’s significance (see “Historical and Cultural Significance” on page 28.)

### **Determine What Treatments are Appropriate**

Appropriate treatments can be adapted from the U.S. Secretary of the Interior’s *Standards for the Treatment of Historic Properties* (1995). The Secretary’s Standards provide an approach for understanding the significance of historic resources and for guiding treatment decisions that preserve the physical fabric and character-defining features of resources. This framework can be applied to the stretch of Historic Route 66 through the Mojave Desert as follows:

**PRESERVE:** Applies to historic features that 1) reflect their period or periods of significance and 2) retain their integrity. For Historic Route 66 this includes design elements that retain their original design and materials in good condition. For example, a few timber trestle bridges are still largely intact, and include original materials, while others have had replacement guardrails or approach rails installed among other items.

Where a historic feature is identified, work will generally focus on the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. Preservation might also be appropriate to retain a specific roadside building or a particular view such as the view down Route 66 from Cadiz Summit toward Chambless (see Figure 60 on page 63).

**MAINTAIN:** applies to the majority of the Historic Route 66 roadway alignment where the goal is to retain the character-defining features of the historic roadway, while addressing safety issues. The Secretary of Interior’s Guidelines use the terms “restoration” and “rehabilitation” but those terms apply to specific engineering practices and are found to confuse engineers. Instead, the emphasis here is on those types of maintenance practices (resurfacing, restoration and rehabilitation, or 3R) that can resolve a safety issue while retaining character-defining features, including “context sensitive replacement” of features integral to the design. For example, timber trestle bridges whose guardrails and approach

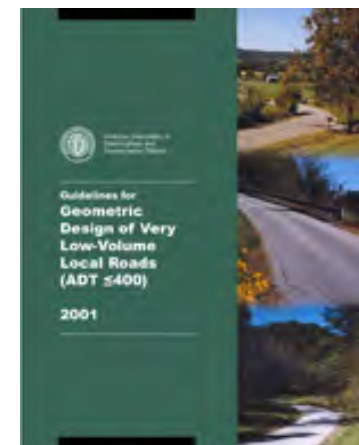


Figure 165 Guidance for work along historic roads should reflect the inherent flexibility built into the AASHTO ‘Green Book’ (top) as documented in AASHTO’s own “Guide to Achieving Flexibility in Highway Design” (middle) and in other special reports such as the Geometric Design of Very Low Volume Local Roads (bottom)

rails have already been replaced could be brought up to current standards using an appropriately designed guardrail that reflects the period of significance but does not attempt to mimic it.

**ENHANCE:** applies to sections of Historic Route 66 where character-defining features are no longer present or where interpretive opportunities exist to tell the story of the route’s development over time. The Secretary of Interior’s Guidelines use the term “Reconstruction”, but that is a term with different meaning in standard engineering practice. Using the same bridge example, if a timber trestle bridge had to be completely replaced due to structural failure, then the design of the new bridge should reflect the traditional design in scale, proportion, and character, but the materials would be modern and up to current standards. A timber trestle bridge could also be replaced by a bridge with a similar method and means of construction, such as a timber trestle bridge kit, but may take on a different appearance. In addition, concrete abutments, foundations and columns could be used depending on local conditions such as hydrology/hydraulics, but will utilize tinting, coloring, texture of timber to minimize impacts.

Once an appropriate treatment has been selected—whether to preserve, maintain, or enhance the character-defining features—then an appropriate design approach must be developed that enables the necessary design flexibility needed to meet treatment goals.



*Figure 166 Historic alignment curves more as it rises up to the top of Cadiz Summit. Historic alignments should be preserved and interpreted. At Cadiz Summit this alignment would make a good interpreted walking path focused on how mountain topography shaped the Route 66 experience in its heyday.*

### **Agree On the Purpose and Need for Proposed Modification**

In addition to major work on 128 timber trestle bridges noted above, most of remaining transportation-related work that will be implemented along Historic Route 66 will likely be resurfacing, restoration, and rehabilitation (3R) work. The purpose of 3R work is primarily to focus on preservation and extension of service life for existing facilities and on safety enhancements. Under the classification of 3R projects, the types of improvements to existing federal-aid highways include: resurfacing; chipseals, pavement structural and joint repair; minor lane and shoulder widening; striping; minor alterations to vertical grades and horizontal curves; bridge repair; cleaning channels under bridges; and, removal or protection of roadside obstacles.

### **Identify Appropriate Guidelines that Apply to Project Activities**

The “Green Book” of the American Association of State Highway Transportation Officials (AASHTO) is the standard reference for design guidance on highways. According to its own foreword, the Green Book “is not intended as a policy for resurfacing, restoration, or rehabilitation (3R) projects”.

Instead, the foreword refers to Transportation Research Board (TRB) Special Report 214, “*Designing Safer Roads: Practices for Resurfacing, Restoration and Rehabilitation*” and related publications for guidance. These reports describe procedures for 3R projects and relationships among safety, cost, tort liability and geometric design.

The intent of TRB Special Report 214 is to begin with existing conditions and performance of the road, rather than to design by attempting to meet numerical design guidelines of the AASHTO Green Book. On a historic road, design of highway modifications should be based on this “careful fit” approach to ensure that a section of highway targeted for a proposed highway modification *will not look substantially different from the rest of the road afterwards*.

Each state was invited to develop and adopt minimum design criteria for non-freeway 3R projects. The result is that states typically employ design criteria for 3R projects that are lower than those contained in the AASHTO Green Book. Using the timber trestle bridge example once again, CalTrans provides guidance to locally administered projects for bridge lane widths that are the same as the approach road lane widths on roads with ADT of less than 750.<sup>3</sup>

AASHTO and FHWA have both published several guidance documents on process, engineering guidance and best practices for context sensitive solutions including the application of more flexibility when using AASHTO “Green Book” guidelines.

For lower volume roads, AASHTO published *Geometric Design of Very Low Volume Local Roads*, which can be utilized to provide the rationale for applying appropriately scaled design values as a means of reducing impact and the footprint of roadway projects. More awareness of this guidance document is needed, as it applies to county funded projects as well as state and federally funded projects on local roads.

## BEST DESIGN AND PRESERVATION PRACTICES

Design and preservation decisions affecting the travel experience of Historic Route 66 can benefit from the use and application of proven practices that have been applied in other similar situations. The following design and preservation practices are recommended based upon similar efforts on historic roadways and scenic byways throughout the country.

<sup>3</sup> See [http://www.caltrans.ca.gov/hq/Local\\_Programs/lam/forms/acrobat/LAPM11A.pdf](http://www.caltrans.ca.gov/hq/Local_Programs/lam/forms/acrobat/LAPM11A.pdf), for example).



Figure 167 The recently reconstructed Amboy bridge maintains the white finish and uses a W-beam guardrail which has been reinforced with a double thickness for crash-worthiness.

### Design Speed and Operating Speed Definitions<sup>1</sup>

*The Design Speed is a selected speed used to determine the various geometric design features of the roadway. (AASHTO, Green Book)*

*Operating Speed— Operating speed is the speed at which drivers of free-flowing vehicles choose to drive on a section of roadway. (TRB Special Report 254, 1998)*

<sup>1</sup> For a more comprehensive history of these terms, please see Fitzpatrick, et al; NCHRP REPORT 504, Design Speed, Operating Speed, and Posted Speed Practices



**Chip Seal** 1.2

**Traffic Range:**  
Typical AADT < 1,000 when placed on aggregate base. Typical AADT < 2,000 when placed on existing HACP.

**Life Expectancy:**  
3 to 7 years (average 5 years).

**Unit Price:**  
Material & Installation: \$1.00 to \$1.50/m<sup>2</sup> (\$0.80 to \$1.25/yd<sup>2</sup>).

**Appearance:**  
Appearance is influenced by the binder and aggregate chip color. Surface texture is influenced by the aggregate size, but is generally coarse.

**Advantages:**  
Lower initial cost than many other surface treatments; Durable; Widely available.

**Limitations:**  
Loose chips can be windshield hazard.

**Product Description:** A chip seal is a single thin surface treatment constructed by spraying a bituminous binding agent and immediately spreading and rolling a single layer of aggregate cover, typically 6 to 9.5 mm (0.25 to 0.375 in.) thick.

Photo Source: Golder Associates Inc. Page 1 of 4

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Figure 168 Example from associated image tools as part of the Federal Lands Highways pavement selection guidelines.



Figure 169 Existing timber rail with desert wash behind showing use of earthen berms to direct storm flows under the bridge.



Figure 170 Historic 'C' shaped guardrail at Victorville's California Route 66 Museum.

### Roadway Geometry

Present Historic Route 66 alignments should be maintained and past alignments preserved. Historic Route 66's alignment is primarily composed of two types of roadway segments: long and straight segments and long curved radii. The exception occurs at points where the road crosses the railroad (such as at Amboy and Ludlow) or where it traverses mountain passes (Cadiz Summit).

The majority of today's Historic Route 66 is used as a secondary highway, with the exception of where it overlaps with other corridors. Portions of the route (US Route 95 between

Needles and Goffs Road and Interstate 40 between exits 2 and 5 and again east of Needles) are Major Highways and Divided Highways respectively. The pavement is generally 26 feet wide with lane widths of 11' and two-foot shoulders for the two lane portions where the road is a secondary highway.

Bridge roadway widths for most of the 128 timber trestle bridges between Mountain Springs Road and Daggett are at least equivalent to approaching lane widths (with a few exceptions). Yet the bridge conditions report indicates that these bridges do not have adequate width. For an historic road, whose original function was replaced by I-40, lane widths are unlikely to increase at any point in the future.

Given very low traffic volumes and limited number of trucks, recreational vehicles and buses, approach lane and bridge widths for new, reconstructed or rehabilitated timber trestle bridges should maintain the same widths and alignments as the approach roads, or as determined on a case by case basis by detailed engineering design to accommodate anticipated design vehicles, including anticipated bicycle and pedestrian use.

### Design Speed versus Operational Speed

Design speed should be matched with desired operating speed to the extent practical, avoiding use of excessive safety margins that tend to induce excessive speeding. Selection of design speed in relation to desired operating speed is one of the most important factors in determining eventual roadway and roadside character.

Where a road is already designed at a much higher design speed than desired operating speed (approaching a settled area for example) actual operating speeds are often perceived by residents to be



excessive. Where land use change has introduced a wider range of turning movements than originally envisioned, unpredictable turning movements may become an issue. Rather than introduce wider roads or turn lanes on an historic road, speed reduction and other traffic-calming measures should be considered to solve the problem (based upon detailed engineering studies). Traffic calming measures are designed to reduce operating speeds to increase safety, rather than widening the road to accommodate high speeds for “through” traffic.

The posted speed limit for much of the route is 55 miles per hour (mph) except when approaching or entering into each community where speed limits are reduced to 35 mph or less. Operational speeds on roadways have not been measured for this planning effort.

Based on informal observations by scenic byway planning team members (and not on actual engineering studies), there appear to be two types of drivers: regular travelers along the route (living or working); and visitors to the route (from both Southern California and from around the world). Visitors, often unfamiliar with the route and communities, are traveling at a relatively slow rate of speed, especially in areas with historic features or other points of interest. Regular drivers are more concerned about getting from their origin to their destination and are traveling at a relatively higher rate of speed. On other byways and historic touring routes, the competing needs of drivers has become a management issue.



Figure 172 Existing (and original) timber bridge railing

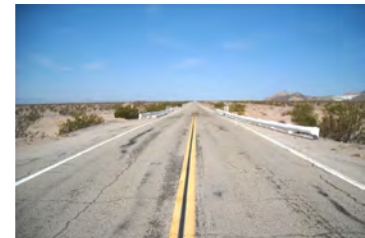


Figure 173 Existing 'C' shaped guardrail painted white (courtesy of San Bernardino County DPW)



Figure 174 Existing 'W' shaped guardrail painted white (courtesy of San Bernardino County DPW); note post caps extend above the 'W' beam



Figure 171 Existing Dola Bridge elevation (above) and two options for bridge abutment treatments (arrows): concrete (top right) and timber (bottom right). Simulations courtesy of San Bernardino County DPW; note post caps will extend above the 'W' beam which will be reinforced by joining two 'W' beams together to increase its strength without increasing the height and proportion of the railing.

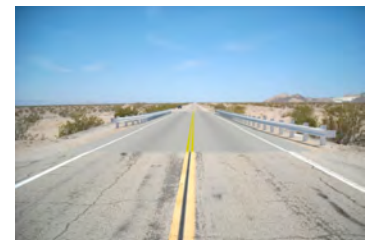


Figure 175 Simulation showing proposed 'W' shaped guardrail painted white (courtesy of San Bernardino County DPW); note post caps will also extend above the 'W' beam



Figure 176 Rough pavement between Newberry Springs and Ludlow limits the potential for bicycle-based heritage tourism.

**From ‘Biking Brian’ —as he blogs on Day 5 of a Route 66 bicycle trip through the desert**

*“Then things started to get interesting after the frontage road went over to the south side of the freeway. I had been wondering why I only saw one car on this stretch for the first 15 miles or so after leaving Ludlow, but now I saw why. The pavement suddenly looked as it went through a war, with many huge cracks in the direction of travel that could swallow up my buddy John’s 38 mm wide tires! This section was the worst of the trip, much worse than the short section between Kingman and Oatman that I had complained about a couple of days ago.”*

<http://www.bikingbrian.com/2010/03/18/route-66-bicycle-tour-day-5/>

### **Pavement Resurfacing**

Context sensitive pavement materials and surfaces may also be more cost effective for pavement resurfacing (see <http://www.cflhd.gov/programs/techDevelopment/pavement/context-roadway-surfacing/documents/context-sensitive-roadways.pdf>).

In a desert environment such as Historic Route 66 between Needles and Barstow, the pavement itself is one of the most dominant visual elements. The Office of Federal Lands Highways (FLH) has developed a pavement selection process (and associated image tools) that provides a choice and balance between functionality, strength, and cost while ensuring that the completed roadway enhances or is, at a minimum, compatible with surrounding landscapes.

Lower traffic volumes associated with Historic Route 66 also provide an opportunity to use pavement surfacing that more closely resembles the historic pavement surface without a significant increase in cost or maintenance. For discussion about the use of chip seal’s affect on bicycle safety, please see “Bicycle Compatibility with Chip Seal Surfaces” on page 136.

### **Drainage**

The engineered system of berms, dips and 128 timber trestle bridges on Historic Route 66 between Needles and Barstow is found nowhere else along the entire route of Historic Route 66 from California to Illinois. The system is a significant engineering feature—adapting the road to the topography and washes of the high desert. The drainage system and the bridges have a symbiotic relationship, having been built simultaneously. Their design treatment is uniform throughout. The majority of the system retains a high level of integrity in design, materials and workmanship to this day. Eligibility of the drainage system for the National Register of Historic Places should be evaluated as a high priority.

### **Structures and Related Elements**

Preserving the most visible design elements such as the remaining historic guardrails while maintaining the character-defining features of the timber trestle bridges through the use of materials that are similar in form, line color and texture to the historic rails is integral to retaining the corridor’s integrity.

There have been three evolutions of guardrail design: the original timber parapet railings (Figure 172) to a ‘C’ shaped metal guardrail painted white (Figure 173) to a ‘W’ shaped guardrail also painted white (Figure 174).

San Bernardino County has developed an approach that allows them to replace the bridge in a manner consistent with its historic scale and materials (Figure 175). The County is recommending that two

‘W’ beam guardrails be bolted together to achieve the desired strength without increasing the height of the guardrail or using the thicker ‘thrie’ beam.

San Bernardino County is considering two options for abutments: one concrete; and the other timber. The less costly concrete retrofit options should be considered for reinforcing the less visible parts on the underside of the bridge deck, abutments, foundation, and columns. Concrete tints should be used to better match desert soil color. Abutments can be made of concrete using formwork and tinting to provide the color and texture of timber. Cost savings can be applied to using higher quality preservation treatments on more visible portions.

While the San Bernardino County approach is the preferred, new types of guardrails that meet current standards may need to be considered in the future if the reinforced ‘W’ Beam approach does not work as anticipated. There are many excellent aesthetic treatments for guardrails that could be applied here, including using rusting steel W-Beam or box beams. Both alternatives would likely meet minimum test level standards for these bridges. Anodized finishes are more consistent with the historic finishes. While more expensive, this approach would minimize the contrast created by the standard galvanized W-beam rails currently being used as replacements.

### **Bicycle Use**

Bicycle accommodations and facilities should be integrated into all future pavement, wayside, and visitor facilities, including provisions for shade, water, repair and other visitor services. Bicyclists preferred road width for touring is 24’ wide (two 12’-wide lanes), with 2’ to 4’ of paved shoulders on each side.

Scenic and historic roads are often sought out by bicyclists as an attractive travel route for both short and long excursions. Historic Route 66 is included as part of the California section of US Bicycle Route 66. Traffic volume on Route 66 is quite low, making it ideal for use by bicycles (and motorcycles) who appreciate its wide open feel and broad desert expanse.

Work is being done to establish US Bike Route 66 across the 8 states through which Route 66 passes. A Preliminary Concept map of the California section of the route was developed for presentation to Southern California Association of Governments (SCAG) in the fall of 2013 by representatives of the advocacy group Adventure Cycling—a group that is actively working to establish bicycle routes that cross the country. California representatives of the group are seeking to establish Bike Route 66 as part of a functional network of regional bicycle routes connecting the

### **California Assembly Language Designating Historic Route 66**

*Based upon RESOLUTION CHAPTER 52, Assembly Concurrent Resolution No.6-Relative to Route 66 [Filed with Secretary of State July 11, 1991], the portion of former U.S. Route 66 extending from the California border to Santa Monica was officially designated as “Historic Highway Route 66”. The resolution further requested that the Department of Transportation “develop an appropriate marker for Historic Highway Route 66, consistent with signing standards, and to identify the cost of erecting a reasonable number of markers along the entire route of former U.S. Highway Route 66, in cooperation with affected local agencies, and in such a manner that will avoid a designation that would lead a motorist to conclude that the entire route is a state-maintained facility;*

*and be it further Resolved*

*That the Department of Transportation, for the portion of former U.S. Route 66 still under its jurisdiction, and local agencies, for the portions of former U.S. Route 66 currently under their jurisdiction, upon receiving donations from private sources and other nonstate funds covering the cost of erecting suitable markers, are hereby directed to erect those markers.”*





Figure 177 Existing gateway sign visible from I-40 over the Colorado River



Figure 178 Pavement markers in urban areas, such as Barstow, are sometimes difficult to see



Figure 179 Pavement markers are combined with other elements in Rancho Cucamonga to improve visibility and enhance the streetscape



Figure 180 In rural areas, such as Amboy, community gateways should be kept simple so as to not compete with the beauty and setting of the town



Figure 181 The interpretive wayside at Danby is a model for future waysides

region and serving commuter, recreational and touring cyclists. A written report was prepared that contains a concept map including National Trails Highway (Historic Route 66) in eastern California's Mohave Desert.

Several challenges need to be overcome before actively promoting the proposed Historic Route 66 bicycle route for either daily or long-distance travel:

- Obtaining water in certain sections can be extremely difficult and even life-threatening, especially with extreme temperatures in warmer seasons.
- The route from Ludlow to Newberry Springs parallels the Interstate and its surface is significantly degraded causing flat tires, bent rims and other damage to bicycles, making it particularly challenging.
- August/September 2014 storms have further degraded road surfaces, closed bridges and left extensive debris from overburden as runoff from storms overtopped bridges and undercut bridge abutments and certain road sections.

### **Bicycle Compatibility with Chip Seal Surfaces**

Given low traffic volumes and limited funding available for routine resurfacing, it is highly likely that a chip seal surface will be utilized. Bicyclists have expressed their opinion on concerns with chip seals. San Bernardino County uses smaller chip rock (e.g. 5/16"), additional sweeping, and application of a fog seal to improve roadway smoothness, remove excess chip rock and bind chips together to reduce future loose chips.

A study performed by the University of California on the "macrotexture" of Caltrans pavement surface treatments and a review of bicycle ride quality surveys led to the following preliminary recommendations relative to bicycle suitability of chip seal<sup>4</sup>:

- To account for bicycle traffic and bicyclist ride quality, modified binder with the finer 3/8" grade chips or smaller should be used and the coarser 3/8" grade should not be used.
- Further measurement of macrotexture on a larger sample of two chip seal test sections with alternative gradations should be performed to better determine the texture variability, as well as their viability when applied to roadways with bicycle traffic.
- Consider either cinder seal, microsurfacing, slurry, or sand seal as a remediation treatment for SLO-1. The slurry and sand seals

4 University of California Pavement Research Center UC Davis, UC Berkeley. *Preliminary Results: Measurement of Macrotexture on Surface Treatments and Survey of Bicyclist Ride Quality on Mon-198 and SLO-1 Test Sections*; Part of Partnered Pavement Research Program (PPRC) Strategic Plan Element 4.47: Impact of Chip Seal on Bicyclists. August 2013. Technical Memorandum: UCPRC-TM-2013-07. See <http://www.ucprc.ucdavis.edu/PDF/UCPRC-TM-2013-07.pdf>



may be the better options because bleeding appeared in test sections with microsurfacing and especially on the section with the cinder seal. The second application of a chip seal to produce a double chip seal may also be considered to improve ride quality but its surface texture may be coarser than that of the slurry or sand seals.

The study also concluded that some actions were not recommended:

- Mandating the use of a steel roller during construction to reduce Mean Profile Depth (MPD) is not recommended by the study (as opposed to allowing a choice of steel or rubber-tired rolling)
- The use of additional rolling after initial construction to reduce MPD is not recommended by the study

### Signage

Sign proliferation should be minimized while providing for adequate route marking and gateway identification as currently practiced (using existing signage requirements from each jurisdiction). There are six types of signage requirements for a route to function as a viable heritage touring destination:

- **Gateway signage to Route 66** - these are primarily used to direct visitors from Interstate or other Primary Routes on the National Highway System to Historic Route 66. These signs already exist for the most part and need to be maintained and periodically replaced.
- **Route markers** - are typically provided (see sidebar, “California Assembly Language Designating Historic Route 66” on page 135).
- **Community Gateways** - Route 66 communities range in size from ghost towns with zero population such as Siberia or the original Bagdad, to Barstow and Needles that serve as regional hubs and provide extensive visitor services. Community gateway signage is needed to associate these communities with the Route 66 Heritage Travel experience.
- **Community Wayfinding** - in the larger communities of Barstow and Needles there is a need to provide Route 66 (and other interstate) travelers with wayfinding signs to museums, historic sites and other exhibits and waysides.
- **Site markers** - Some Route 66 historic sites were marked as part of a signage program implemented with funding from Hampton Inns (See Figure 118 on page 107, for example). Additional sites are marked with State of California Historic Markers (See Figure 4 on page 2, for example).
- **Interpretive Information** - An interpretive display was installed at Danby Rest Area with funding from BMW (Figure 181).

Legislation led to erection of brown signs with white lettering along Interstate 40 directing travelers to Historic Route 66. San Bernardino County installed painted route markers on the road surface of Historic Route 66 to eliminate the problems associated with theft,

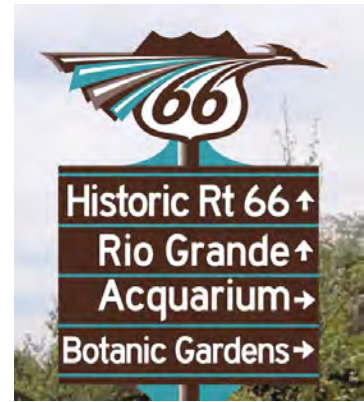
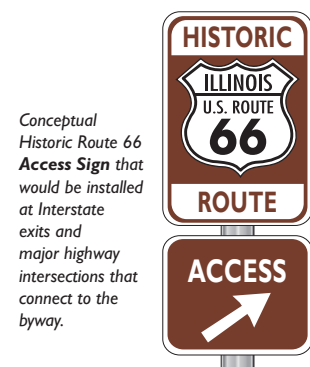


Figure 182 Albuquerque is taking the roadrunner image and slicing it through the Route 66 shield.



Conceptual Historic Route 66 Access Sign that would be installed at Interstate exits and major highway intersections that connect to the byway.



Standardized directional signs to primary attractions. The design replicates the colors and Route 66 shield of the IDOT highway signs, which travelers are used to watching for.

Figure 183 Illinois Route 66 developed this scheme for wayfinding signage in their 2008 interpretive plan

vandals and souvenir hounds that made it difficult to maintain metal route marker signs. The painted surface route marker symbol has become an icon of travel along Route 66.

As a result of these ongoing signage efforts, Route 66 itself is adequately marked for visitors. However, signage programs need to continually be maintained and in some cases refreshed to ensure that the signage program is supporting the heritage tourism goals.



Figure 184 Chicago Solar Plug-In Charging Station (Source: Inhabitat)

### **Electric Vehicle Support Facilities**

There has been considerable discussion about making Historic Route 66 an electric highway. The Historic Electric Vehicle Foundation (HEVF) promoted the effort at the Route 66 International Festival in August 2014. The theme, “Crossroads of the Past and Future,” appropriately substantiated presentations on installation of charging stations along the Mother Road and the history of electric and alternative energy vehicles in America.<sup>5</sup> HEVF opened the world’s first International Electric Vehicle Museum in Kingman, Arizona in conjunction with the festival in August.



Figure 185 CART 66 Historic Gas Station Awning

The necessity of charging stops for electric cars would provide opportunities for substantiating destinations along the route. Rest stops that were once popular during the heyday of the route could be reborn or reinvented. Cultural images and experiences of the roadway could be coupled with new technology, as solar-powered EV charging stations begin to emerge. The iconic gas station awnings along Route 66 could be rebuilt, meeting current building code specifications, to support the solar infrastructure necessary for EV charging.



Figure 186 Example of curved PV panel installed on utility poles directly may be a more attractive alternative

Solar panel technology required for EV charging stations should be integrated directly onto the top of a structurally approved canopy if the angle is appropriate. Alternatively, ground mounted units that are appropriately sited behind the historic structure could be used with jurisdictional approval.

Charging stations are becoming popular around and within National Parks as agencies such as the Black Bear Solar Institute (BBSI) support the US Department of Energy’s “the EV Project.” A “Green Gateway” in Tennessee was established by BBSI linking Interstate Highways and major metropolitan areas in Tennessee with the Great Smoky Mountains National Park (GSMNP). With this technology, electric vehicles are able to tour GSMNP without emissions, reducing haze that obscures views to distant mountain ridges and balds. Future plans will bring solar electric shade canopies to gateway communities of GSMNP.

<sup>5</sup> EV World.com article, Historic EV Foundation Supports Route 66 National Electric Highway <http://evworld.com/news.cfm?rssid=32240>