Methodology to Identify Preservation Priority Bridges

Louisiana Historic Bridge Inventory

Task 8

Prepared for

Louisiana Department of Transportation and Development

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Table of Contents

Figures

Tables

Appendices

List of Abbreviations/Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
FHWA	Federal Highway Administration
HBI	Historic Bridge Inventory
LADOTD	Louisiana Department of Transportation and Development
MSF	Master Structure File
National Register	National Register of Historic Places
NBI	National Bridge Inventory
NCHRP	National Cooperative Highway Research Program
SHPO	State Historic Preservation Office
USCG	United States Coast Guard

Executive Summary

This report presents a structured methodology to identify historic bridges in Louisiana that are most suitable for preservation. It represents an interim step in the larger Historic Bridge Inventory project. The methodology balances engineering and historical considerations to provide a means of categorizing the preservation potential of Louisiana's historic bridge population, which includes structures listed in or determined eligible for listing in the National Register of Historic Places (National Register).

The methodology draws upon bridge-specific data obtained from the most recent bridge inspection (as recorded in the National Bridge Inventory) and field review conducted for this project to evaluate each historic bridge in a way that is both transparent and justifiable. For each historic bridge, a Condition Score is calculated to measure a bridge's geometry, structural capacity, and other safety factors that affect is suitability for preservation in continued vehicular use. Condition Scores are an indicator of preservation potential; further analysis confirms this potential.

Historic bridges identified as most suitable for preservation as an outcome of applying this methodology will be categorized as Preservation Priority Historic Bridges. To recognize the important variations that exist within Louisiana's historic bridge population, it was an important goal for the project to identify at least one Preservation Priority Historic Bridge within each bridge type. Non-Priority Historic Bridges are relatively poor candidates for preservation based on their present condition. Non-Priority status does not preclude a bridge from being preserved, but it does indicate that a greater effort would be required to keep the bridge in vehicular service. Preservation Candidate Historic Bridges fall into an intermediate group that recognizes bridges with certain deficiencies that may have potential for preservation if further analysis deems it feasible and prudent.

A team of qualified structural engineers and professional historians with expertise in historic bridge rehabilitation will apply the methodology to recommend a category for each historic bridge. The Historic Bridge Inventory (HBI) Committee will review the proposed categorization. The Federal Highway Administration (FHWA) will issue a final list that assigns each historic bridge to its appropriate category.

1. Introduction

Historic bridges are an important part of Louisiana's culture and transportation history. To preserve and protect this legacy, the Louisiana Department of Transportation and Development (LADOTD), in cooperation with the Federal Highway Administration (FHWA) and the State Historic Preservation Office (SHPO), is undertaking this statewide Historic Bridge Inventory project. Representatives of these three agencies served as members of the HBI Committee, providing direction to the project team and review of interim and final work products. Results of the Historic Bridge Inventory project will facilitate LADOTD and FHWA compliance with federal laws and regulations that affect historic properties, including bridges. The ultimate goal of this project is to identify historically significant bridges suitable for preservation, and to develop a process for their management and preservation.

The *National Register Eligibility Determination Report* (September 2013) presents the results of the eligibility evaluation of pre-1971 bridges for listing in the National Register. The population of bridges subject to this inventory is those built before 1971 that are owned by state, federal, or local entities, with certain exclusions.[1] As a result of the recent evaluation, each bridge in the subject population has been determined either eligible or not eligible for listing in the National Register. A small number of bridges were previously determined eligible or listed in the National Register. Bridges determined eligible for listing or previously listed in the National Register are termed "historic bridges." Most of these historic bridges will be subjected to prioritization for preservation potential (see Appendix A for bridges that are excluded because the Section 106 process is already underway). This report presents the methodology by which bridges will be prioritized for preservation. After the methodology is applied, each historic bridge will be categorized as Preservation Priority, Preservation Candidate, or Non-Priority. An important goal for the project is to identify at least one Preservation Priority Historic Bridge within each type.

The project team that developed, and will subsequently implement, the methodology includes structural engineers with expertise in historic bridge rehabilitation and FHWA bridge inspection standards, as well as qualified professional historians with knowledge of, and experience applying, the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (Secretary's Standards) to historic bridge rehabilitations. Based on the team's recommendations, the FHWA will determine the appropriate category for each bridge with input from the LADOTD and SHPO.

The *Guidelines for Historic Bridge Rehabilitation and Replacement,* accepted by American Association of State Highway and Transportation Officials (AASHTO) in November 2008, provide direction on how to determine preservability of a historic bridge. These guidelines provide a framework for making decisions about the preservation potential of individual historic bridges that is based on engineering data and judgments. These guidelines state:

[1] Exclusions are identified in the *Bridge Stratification and Data Collection Methodology*, December 2012.

> Preservability of a historic bridge, as with any bridge, is a factor of its ability to perform adequately, which is defined by engineers as meeting current minimum standards or guidelines in the areas of load capacity (structural), geometry (functional) and safety. The cost to achieve and maintain adequacy in these areas must also be factored into any definition of preservability.[2]

Other standards and guidelines that inform the methodology and the decisions that will result from its application include:

- AASHTO's *Guidelines for Geometric Design of Very Low-Volume Roads* (2001) – included as Appendix B to this report.
- LADOTD's *Minimum Design Guidelines* (2009) – included as Appendix C to this report.
- Virginia Transportation Research Council's *Secretary of the Interior's Standards for the Treatment of Historic Properties*, as Adapted for Historic Bridges – included as Appendix D to this report.

After each historic bridge is categorized, the HBI Committee will enter the final phase of the Historic Bridge Inventory project. This phase involves finalizing a Programmatic Agreement (PA) for historic bridges that was begun in September 2012. The HBI Committee, with input from consulting parties, decided to defer completion of the PA until the population of historic bridges had been identified (now complete) and after determination of historic bridges as Preservation Priority/Preservation Candidate/Non-Priority bridges. The PA will document a process for treatment of bridges in each category and will codify commitments to historic bridge preservation made by the FHWA and LADOTD. Agencies will execute the PA pursuant to the regulations implementing Section 106 of the National Historic Preservation Act of 1966 (Section 106) (16 U.S.C. 470f).

Neither the PA nor application of this methodology fulfills requirements of Section 4(f) of the U.S. Department of Transportation Act of 1966 that apply to certain protected properties, including historic bridges. However, application of this methodology to an individual bridge provides information that should be considered under the Section 4(f) analysis that is undertaken during project development, including whether or not an alternative is prudent and/or feasible.[3] The FHWA is ultimately responsible for making all decisions related to Section 4(f) compliance. These include whether Section 4(f) applies to a property, whether a use will occur, assessment of each alternative's impacts to Section 4(f) properties, and determining whether the law allows the selection of a particular alternative after consulting with the appropriate officials with jurisdiction.

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[2] Lichtenstein Consulting Engineers, Inc., *Guidelines for Historic Bridge Rehabilitation and Replacement*, Requested by the American Association of State Highway and Transportation Officials, (March 2007), A-2. These guidelines were released in draft form in March 2007 and officially accepted by AASHTO in November 2008. The guidelines are not included as an appendix to this report, but are available on the AASHTO website here: https://bookstore.transportation.org/item_details.aspx?id=1364.

[3] An alternative is prudent and feasible if it meets the test in 23 CFR 774.17.

2. Definitions

Approach roadway alignment evaluation – This item in the Condition Score identifies those bridges that do not function properly or adequately due to the alignment of the roadway approaches. The basic criteria is how the alignment of the roadway approaches to the bridge relate to the general highway alignment for the section of highway for the bridge. (Approach roadway alignment evaluation is National Bridge Inventory [NBI] Item 72.)

Approach width compared to bridge roadway width – This item in the Condition Score compares the clear width of the roadway leading up to the bridge with the clear roadway width on the bridge. (Approach width is NBI Item 51 and bridge roadway width is NBI Item 32.)

Average Daily Traffic (ADT) – The number of vehicles that cross the bridge each day, sum of each direction. (Current ADT is NBI Item 29.)

Bridge posted – The actual signage that appears on a bridge if the structural load capacity of the bridge is less than the operating rating. The posting signs indicate the gross vehicle weights for both single axle and combination axle vehicles. The NBI data includes codes to record the bridge posting. For example, a code of 03 would indicate a maximum load of 3 tons for a single axle vehicle. A code of 25-40 would indicate a maximum load of 25 tons for single axle vehicle and 40 tons for a combination axle vehicle.

Bridge type – A grouping of bridges with similar structural members and material composition. A multi-span structure may include more than one bridge type. For the Historic Bridge Inventory, bridges were analyzed based on their main span type. Within certain bridge types, there exist subtypes that on their own reflect important engineering variations. See Table 1 for a list of bridge types and subtypes.

Bypass/detour length – The total additional travel length in miles for a vehicle that would result from closing the bridge. (Bypass/detour length is NBI Item 19.)

Channels and channel protection (scour) – This item describes the physical conditions associated with the flow of water through the bridge, such as stream bank stability and the condition of the channel and channel banks, riprap, slope protection, or stream control devices including spur dikes. (Channels and channel protection is NBI Item 61.)

Condition Score – The Condition Score was developed for this methodology to isolate and assess controlling elements that affect a bridge's suitability for preservation in continued vehicular use (see Section 3, Step 2 for more information on Condition Score). Elements included in this measure are structural adequacy, geometry, waterway adequacy, and scour potential. The elements are drawn from NBI data to assess the overall condition of a bridge, as inspected.

Deck geometry evaluation – Rating by comparison of the average daily traffic and the clear roadway width on the bridge, considering the functional classification of the roadway and the number of lanes across the bridge. (Deck geometry evaluation is NBI Item 68.)

Feasible – A project alternative that can be constructed as a matter of sound engineering.[4]

Functional classification – Coding for the route on which the bridge is located, designated as rural or urban, with six classifications for each rural and urban. (Functional classification is NBI Item 26.)

Functional obsolescence – The FHWA classification of a bridge that cannot meet current traffic needs because of inadequate horizontal or vertical clearance, inadequate load-carrying capacity, and/or insufficient opening to accommodate water flow under the bridge. While structural deficiencies are generally the result of deterioration of bridge components, functional obsolescence results from changing traffic demands on the structure.

Historic bridge – A bridge that has been listed in or determined eligible for the National Register.

Historic Bridge Inventory – The name of the overall project that is underway to identify historic bridges in Louisiana that are suitable for preservation. The project involves multiple phases including the development and implementation of a Methodology to Identify Priority Bridges (as documented in this report).

Historic Bridge Inventory (HBI) Committee – The team providing direction and review of interim and final work products for the Historic Bridge Inventory project. Representatives of the LADOTD, FHWA, and SHPO serve as members.

Historic bridge pool – A grouping of historic bridges that share a common type and, in certain cases, subtype.

Historic integrity – Historic Integrity is the ability of a property to convey the significance that makes it eligible for the National Register. Within the concept of integrity, the National Register criteria recognizes seven aspects or qualities that, in various combinations, define integrity. To retain historic integrity a property will always possess several, and usually most, of the following seven aspects: location, design, materials, setting, association, feeling, and workmanship.[5]

HS20-44 – Standard AASHTO multi-axle design vehicle with a weight of 36 tons.

Low volume road – A road that carries ADT of less than or equal to 400.

Master Structure File (MSF) – The LADOTD's bridge inspection database based on Louisiana's inventory of bridges as reported to the FHWA. See also National Bridge Inventory (NBI).

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[4] Definition based on the FHWA's evaluation of these factors associated with protecting Section 4(f) property, which include historic bridges. From FHWA Environmental Review Toolkit, http://www.environment.fhwa.dot.gov/4f/4fAtGlance.asp (accessed 9 September 2013).

[5] Definition adapted from *National Register Bulletin: How to Apply the National Register Criteria for Evaluation*, http://www.nps.gov/nr/publications/bulletins/nrb15/nrb15_8.htm (accessed 9 September 2013).

National Bridge Inventory (NBI) – Bridge inventory and appraisal data collected by the FHWA to fulfill the requirements of the National Bridge Inspection Standards. Each state maintains an inventory of its bridges subject to these standards and sends an annual update to the FHWA. During a bi-annual inspection, a certified bridge inspector assigns ratings to components of each bridge. NBI ratings of 5 or better indicate satisfactory condition.

National Register of Historic Places (National Register) – The official inventory of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, which is maintained by the Secretary of the Interior under the authority of the National Historic Preservation Act of 1966 (as amended).

Navigation control – Coding for whether or not a bridge permit is required for navigation. If no waterway, coding is N for Not Applicable. The inspector will code 0 if no permit is required or code 1 if navigation permit is required. (Navigation control is NBI Item 38.)

Non-Priority Historic Bridge – A historic bridge that is not an ideal candidate for long-term preservation and can be removed and replaced when needed applying standard mitigation treatments.

Pier protection – If navigation control has been coded as 1 (required), this item indicates the presence and adequacy of pier or abutment protection features such as fenders, dolphins, or other substructure protection devises. (Pier protection is NBI Item 111.)

Preservation – As used in this report, this term refers to historic preservation that is consistent with the Secretary's Standards. Historic preservation means saving historic bridges from destruction or deterioration, and providing for their continued use by means of restoration, rehabilitation, or adaptive reuse. It is the act or process of applying measures to sustain the existing form, integrity, and material of a historic bridge, and its site and setting.[6] The FHWA's Highway Bridge Replacement and Rehabilitation Program (HBRRP) describes preservation differently, focusing on repairing or delaying the deterioration of a bridge whether classified as historic or not.

Preservation Candidate Historic Bridge – A historic bridge designated for maintenance and preservation when feasible and prudent.

Preservation potential – A bridge has preservation potential if it can continue in vehicular use with or without a rehabilitation effort.

Preservation Priority Historic Bridge – A historic bridge designated for preservation in long-term use and which will be maintained and rehabilitated as needed.

Prudent - A project alternative is prudent if it meets the test in 23 CFR 774.17, which includes factors assessing safety or operational problems; how well project purpose and need are met; the severity of

[6] Definition adapted from the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, http://www.nps.gov/hps/TPS/standguide/preserve/preserve_index.htm (accessed 12 September 2013).

social, economic, or environmental impacts; and the severity of impacts to environmental resources protected under other federal statutes.[7]

Rehabilitation – As used in this report, this term refers to rehabilitation that is consistent with the Secretary's Standards. It is the act or process of returning a property to a state of utility and making a possible compatible use for a property through repair, alterations, and additions allowing for an efficient contemporary use while retaining those portions or features that convey its historical, cultural, or architectural values. Rehabilitation may include a combination of retention and repair of historic materials to maintain the overall historic character of the bridge. Replacement of historic materials may be permitted if retention and repair are not feasible.[8]

Roadway width compared to current ADT – This item compares the clear roadway width between curbs or rails on the bridge with the current ADT. (Roadway width is NBI Item 51 and current ADT is NBI Item 29.)

Structural capacity (tons) – Also called operating rating. The gross weight that will produce stresses in a bridge that would not be exceeded or allowed regularly, without a commensurate increase in the rate of surveillance to detect any changes in structural integrity. The basis for assessment is 36 tons gross vehicle weight. (Structural capacity is NBI Item 64B.)

Structural evaluation – Structural evaluation rating compares the ADT and the inventory rating of the structure. This rating is then compared to Item 59-superstructure rating and Item 60-substructure rating, and the lowest of the three evaluations is used. (Structural evaluation is NBI Item 67.)

Structurally deficient – Classification indicating poor structural condition for any of the following: deck, superstructure, substructure, or culvert (if applicable). A structurally deficient bridge is restricted to lightweight vehicles, and requires immediate maintenance or rehabilitation to remain open to traffic or replacement.

Substructure rating – This item describes the physical condition of piers, abutments, piles, fenders, footings or other components below the bearings. (Substructure rating is NBI Item 60.)

Subtype – An important engineering variation that exists within certain bridge types.

Superstructure rating – This item describes the physical condition of all structural members, including trusses, beams, girders, arches, deck, or other components above the bearings as applicable based on bridge type. (Superstructure rating is NBI Item 59.)

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[7] Definition based on the FHWA's evaluation of these factors associated with protecting Section 4(f) property, which include historic bridges. From FHWA Environmental Review Toolkit, http://www.environment.fhwa.dot.gov/4f/4fAtGlance.asp (accessed 9 September 2013).

[8] Definition adapted from the Secretary *of the Interior's Standards for the Treatment of Historic Properties*, http://www.nps.gov/hps/TPS/standguide/rehab/rehab_index.htm (accessed 12 September 2013).

Vehicular bridge – A bridge that actively carries motorized traffic on the local or state roadway system.

Waterway adequacy – This item appraises the waterway opening with respect to passage of flow through the bridge, and considers the chance of flow overtopping the bridge deck and roadway approaches to the bridge. (Waterway adequacy is NBI Item 71.)

3. Methodology

This methodology is used to categorize historic bridges according to their suitability for preservation. Historic bridges determined as Preservation Priority are relatively better candidates for preservation based on their present condition or suitability for rehabilitation and potential to remain in use for years into the future. Non-Priority Bridges are relatively poor candidates for preservation based on their present condition and limitations to rehabilitation. Non-Priority status does not preclude a bridge from being preserved, but it does indicate that a greater effort would be required to keep the bridge in vehicular service. Preservation Candidate Bridges fall into an intermediate group that recognizes potential for preservation if further analysis deems it feasible and prudent.

The methodology balances engineering and historical considerations to provide a means of prioritizing historic bridges for preservation. It draws upon bridge-specific data obtained from the most recent bridge inspection and field review conducted for this project to evaluate each historic bridge. The project team prepared a Historic Bridge Inventory database as a means to compile and organize data for historic bridges. Information included in the LADOTD's MSF and the FHWA's NBI provided the initial data for each bridge. Individual bridge records were subsequently expanded to include data collected through this project. For each bridge, data includes the current inspection record, photographs of each bridge taken during the field survey phase of the Historic Bridge Inventory project, and plan sheets and past inspection records (where available).

For each historic bridge, a Condition Score is calculated to measure a bridge's geometry, structural capacity, and other safety factors that are considered for preservation of a bridge for continued vehicular use. Current NBI inspection data is used to calculate this score. Condition Scores are an indicator of preservation potential that is then confirmed through further analysis. A bridge has preservation potential if it can continue in vehicular use with or without a rehabilitation effort. This analysis looks at how rehabilitation can address any deficiencies in combination with consideration for the bridge's geometry, load capacity, detour, and navigation control (where applicable). After evaluating these considerations, each bridge can be placed into its appropriate category of Preservation Priority, Preservation Candidate, or Non-Priority. The steps undertaken to arrive at the categorization of each bridge are described below. Figure 1 illustrates the overall process.

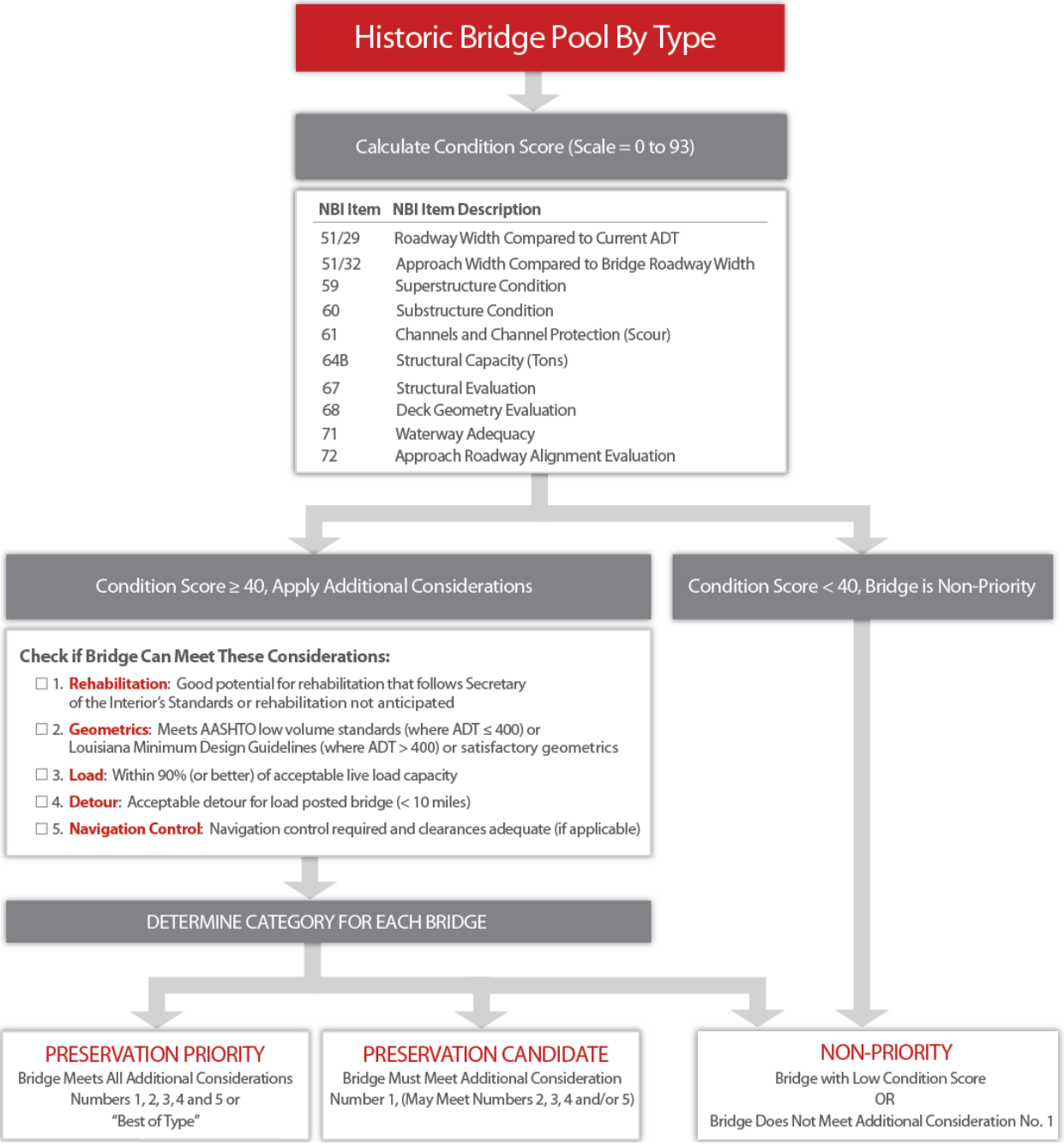

Figure 1. Overview of Preservation Priority/Preservation Candidate/Non-Priority Methodology

In certain cases, a piece of data for a specific bridge that is necessary to apply the methodology may not be included in the NBI or MSF data. To address data gaps, the project team will review the inspection records for the bridge maintained by the LADOTD or, where necessary, go on-site to obtain needed data. In a few cases, a bridge owner (other than the state) may be contacted to request missing data. An additional quality review to confirm NBI component ratings involved field photographic documentation of components with poor ratings (e.g., superstructure or substructure rated 4 or below).

For historic bridges with components appraised as poor, a certified bridge inspector will review photographs that document poor component ratings to assess their appropriateness. If this data does not provide sufficient information to make an assessment, an inspector will either review in-depth the inspection records for the bridge maintained by LADOTD or, where necessary, go on-site to assess the poorly rated component. This approach will enable decision-making with the full set of data needed for each bridge.

Step 1: Organize historic bridge pool by type

In recognition of the important variety that exists within Louisiana's historic bridge population, it was an important goal for the project to identify at least one Preservation Priority within each bridge type. Bridge types, as well as subtypes that on their own reflect important engineering variations, were identified in an earlier step of the Historic Bridge Inventory project. The results are included in *National Register Eligibility Determination Report* (September 2013). The list of bridge types and subtypes in Table 1 is drawn from those results. In this step of the methodology, each historic bridge is placed into a pool with other bridges of its type, or subtype where applicable.

Table 1. Eligibility results by bridge type

Bridge type	Population	Total eligible (includes previously listed or determined eligible)
Concrete arch	9	9
Concrete beam and girder (pre-1946)	92	11
Concrete rigid frame	5	5
Culvert (pre-1946)	245	2
Movable	87	70
Steel beam and girder (pre-1946)	33	14
Timber	1,089	0
Truss	31	28
Common types (post-1945)	2,988	11
Total	**4,579**	**150**

Step 2: Calculate Condition Score for each bridge

The Condition Score calculation is an evaluation tool used to identify historic bridges for preservation potential based on current conditions as reported in the most recent inspection report. The Condition Score serves as an indicator of the preservation potential of a bridge by isolating factors that typically control whether preservation is prudent and feasible. Condition Scores are also used to compare bridges within a type to identify the best candidates for preservation.

The Condition Score calculation reviews the NBI values assigned to bridge components by inspectors and assigns a score for each item listed (see Table 2).[9] NBI values are then combined to arrive at a composite score (see Appendix E for a sample calculation). The highest possible Condition Score is 93 points, which is based on a maximum of 10 points for structural capacity and roadway width factors and nine points for the remaining factors based on current inspection evaluations. Four factors involve structural adequacy totaling a maximum of 37 points (see NBI Items 64B, 59, 60, and 67) with three factors involving functional adequacy totaling a maximum of 29 points (see NBI Items 51/29, 51/32, and 68). There are three single factor elements with one factor involving waterway adequacy (see NBI Item 71) for up to nine points, one factor involving the approach roadway alignment (see NBI Item 72) for up to nine points, and one factor involving the channel condition and channel protection to evaluate scour issues (see NBI Item 61) for up to nine points. The summation of these factors arrives at a Condition Score for each bridge, which will range from a low of 0 to a high of 93.

Table 2. Condition Score calculation

NBI Item	NBI Item description	Formula to calculate Condition Score
51/29	Roadway Width Compared to Current ADT (NBI Factor H)*	If NBI SR Factor H = 0, then value = 10, otherwise value = 10 - 10xH/15
51/32	Approach Width Compared to Bridge Roadway Width	If bridge roadway width +2 ft less than or equal to approach width, value = 0, otherwise value = 10
59	Superstructure Condition	If greater than or equal to 4 then value = actual rating (maximum of 9); If less than 4 value = 0
60	Substructure Condition	If greater than or equal to 4 then value = actual rating (maximum of 9); If less than 4 value = 0
61	Channels and Channel Protection (Scour)	If greater than or equal to 4 then value = actual rating (maximum of 9); If less than 4 value = 0
64B	Structural Capacity (Tons)	If capacity is greater than or equal to 36 tons, value = 10, otherwise value = 10XCapacity/36
67	Structural Evaluation	If greater than or equal to 4 then value = actual rating (maximum of 9); If less than 4 value = 0

[9] See the FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges for more information on NBI component ratings. This data is drawn from the MSF.

Table 2. Condition Score calculation

NBI Item	NBI Item description	Formula to calculate Condition Score
68	Deck Geometry Evaluation	If greater than or equal to 4 then value = actual rating (maximum of 9); If less than 4 value = 0
71	Waterway Adequacy	If greater than or equal to 4 then value = actual rating (maximum of 9); If less than 4 value = 0
72	Approach Roadway Alignment Evaluation	If greater than or equal to 4 then value = actual rating (maximum of 9); If less than 4 value = 0

** The H factor is derived from Line 2B in the NBI Sufficiency Rating Formula. It is a defined method of comparing clear roadway width with ADT.*

Step 3: Sort Condition Scores from high to low

Bridges within each type are next sorted by Condition Score from high to low. Sorting bridges allows for appropriate initial focus on the best candidates for preservation. To determine Condition Scores that indicate high and low potential for preservation, thresholds for high and low scores were determined. The *Guidelines for Historic Bridge Rehabilitation and Replacement* (Guidelines), accepted by AASHTO in November 2008, inform the identification of these thresholds.

The Guidelines recommend that a bridge generally has rehabilitation potential when it meets these criteria: NBI ratings of 5 (fair) or above for substructure and superstructure condition, adequate structural capacity, and adequate roadway geometry or geometric conditions that can be improved.[10] This formed the basis of the determination for the high Condition Score threshold of 60. A Condition Score of 60 will result when bridge components appraised by inspectors are rated 5 (fair) and a bridge receives the maximum value for roadway width and load capacity. Appraisal ratings higher than 5 will increase the Condition Score. Any bridge with a Condition Score of 60 or above has good preservation potential, and the higher the score, the better the potential.

The Guidelines note: "A condition code value of 4 (poor) will require further study to determine if there are feasible and prudent options for rehabilitation."[11] An accumulation of issues including bridge components appraised by inspectors as 4, in combination with inadequate roadway width and load capacity, will result in a Condition Score of 40. Appraisal ratings lower than 4 will decrease the Condition Score. Any bridge with a Condition Score of 40 or lower has poor preservation potential; the lower the score, the less likely that it would be prudent and feasible to preserve the bridge. Therefore, bridges with a low Condition Score are categorized as Non-Priority without further analysis. An exception is made where the entire pool within a type scores below the threshold of 40. In this case, bridges within the pool are evaluated in Step 4 under "further evaluation to determine best of type" to identify a Preservation Priority Historic Bridge where possible.

Bridges with Conditions Scores between 40 and 59 are considered intermediate. Bridges with intermediate scores move on to Step 4 and may be categorized as Preservation Priority or Preservation Candidate depending on the results of this analysis.

[10] *Guidelines for Historic Bridge Rehabilitation and Replacement*, A-30-31.

[11] *Guidelines for Historic Bridge Rehabilitation and Replacement*, A-31.

Step 4: Apply additional considerations

In this step of the methodology, structural engineers, with input from professional historians, analyze bridges with high and intermediate Condition Scores individually to determine preservation potential. Consideration is given to a bridge's existing condition and function, as well as its potential condition and function, including whether future rehabilitation activities can be accomplished without compromising historic integrity. Bridges that meet the additional considerations in this step will be recommended as Preservation Priority bridges. If the results of the analysis indicate that it is prudent and feasible to preserve a particular bridge but certain deficiencies would remain, the bridge will be recommended as a Preservation Candidate. If a Preservation Priority Historic Bridge cannot be identified from within the bridges with high or intermediate scores, bridges with a low Condition Score are considered. In the case of a bridge type where all of the bridges have a low Condition Score, the pool is evaluated to find the best of the type as outlined below. It should be noted that certain Preservation Priority or Preservation Candidate Historic Bridges may require a design exception to remain in vehicular use.

The following five additional considerations are applied:

1. **Rehabilitation** – Determine if the bridge has good potential for rehabilitation that follows the Secretary's Standards.

2. **Geometry** – Bridge meets AASHTO low volume standards (where ADT is less than or equal to 400) or Louisiana Minimum Design guidelines (where ADT is greater than 400).

3. **Load** – Bridge is within 90 percent (or better) of acceptable live load capacity. This is based on live load capacity equal to or greater than 90 percent of AASHTO HS20-44 live load (36-ton vehicle) which is equivalent to a load posting of 25-40.

4. **Detour** – Acceptable detour for load posted bridge of less than 10 miles. If a bridge is not load posted, this consideration does not apply.

5. **Navigation control** – Navigation control required and adequate. Also clearances adequate, if applicable for bridges over navigable waterways.

See Appendix F for a sample Application of Additional Considerations.

Consideration 1 can be met in one of two ways. First, if a historic bridge's superstructure and substructure condition are already satisfactory (i.e., superstructure and substructure are appraised as satisfactory with an NBI condition rating of 5 or better), and the bridge has adequate geometry and load capacity, it will meet this consideration because rehabilitation is not needed to remain in vehicular use. The second way to meet the consideration is if the engineer and historian determine that the bridge's deficiencies can be addressed by a rehabilitation effort that, in their joint professional judgment, would adhere to the Secretary's Standards. This professional judgment is informed by the Virginia Transportation Research Council's *Secretary of the Interior's Standards for the Treatment of Historic*

Properties, as Adapted for Historic Bridges (included as Appendix D) and past experience rehabilitating historic bridges.

In consideration 2, the number of lanes on the bridge, current ADT, and the functional classification of the bridge for the roadway system is reviewed. This review determines whether or not the bridge is functionally adequate based on its geometrics. Consideration 2 can be met in several ways:

- If the current ADT on the bridge is less than or equal to 400, then the AASHTO low volume standards apply and the bridge is evaluated for its ability to meet this standard. Bridges that meet the applicable standards are considered to meet this consideration.

- For ADT greater than 400, the bridge is evaluated to determine if it meets the Louisiana *Minimum Design Guidelines*. Bridges that meet the applicable standards are considered to meet this consideration.

- The engineer determines that the bridge's width is adequate based on professional judgment. This professional judgment considers bridge width compared to approach width and accident history, and is informed by the AASHTO low volume standards or the Louisiana *Minimum Design Guidelines*, as applicable, and past experience rehabilitating historic bridges.

- The engineer determines that the bridge's deficiencies can be addressed through rehabilitation (also informed by consideration 1).

In consideration 3, the live load capacity of the bridge for the roadway system is reviewed. This consideration is met if the bridge has a live load capacity equal to or greater than 90 percent of AASHTO HS20-44 live load (36-ton vehicle), which is equivalent to a load posting of 25-40. For bridges where the live load capacity is less than 90 percent of AASHTO HS-20-44, consideration is given to the potential for rehabilitation of the deficient substructure or superstructure component to increase the live load capacity for the functional classification of the roadway to at least a posting of 25-40. If the bridge has adequate load capacity or can be rehabilitated to achieve adequate load capacity without compromising the bridge's historic integrity, it meets this consideration.

In consideration 4, the bridge is reviewed for load posting. If the bridge is not load posted, then the bypass/detour length criteria of less than 10 miles is not applicable and the bridge meets this consideration. If the bridge is load posted and there is an available bypass/detour route of less than 10 miles, the bridge would also meet this consideration.

In consideration 5, navigation controls and protection of the structure are reviewed. Horizontal and vertical clearances are reviewed for both movable and fixed bridges over navigable waterways. A bridge meets this consideration if navigation control is required and protection is adequate (or can be made adequate), and if the required horizontal and vertical navigation clearances are met (or can be addressed through rehabilitation). For bridges where navigation control is not required, this consideration is not applicable.

Further evaluation to identify best of type

In the instance where no Preservation Priority bridges are identified for a particular bridge type, the pool is further evaluated to identify one bridge that offers the best opportunity for preservation while retaining historic integrity. Primary consideration is given to live load capacity and whether the bridge is located on a truck route, if alternate routes are available, and the length and existence of a detour/bypass route. Secondary considerations include the bridge clear width in combination with the ADT, as well as the bridge clear width compared to the approach roadway width. Accident history, if available, is also considered, especially in those cases where the bridge is significantly narrower than the approach roadway. Since bridges in this situation are most likely to require rehabilitation to remain in service, the bridge chosen as a Preservation Priority will be the one that best demonstrates that it is both feasible and prudent to preserve.

Step 5: Determine category for each bridge

Following the analysis in Step 4, each bridge is categorized as follows:

1. Preservation Priority – A historic bridge that meets all of the additional considerations will be recommended as a Preservation Priority; or is the best of type as determined through further evaluation.

2. Preservation Candidate – A historic bridge that has a Condition Score of 40 or greater, meets additional consideration 1, and may meet additional considerations 2, 3, 4, and/or 5, will be recommended as a Preservation Candidate.

3. Non-Priority – A historic bridge that has a Condition Score less than 40 or does not meet additional consideration 1 will be recommended as a Non-Priority.

4. Special Circumstances

This methodology provides a consistent and justifiable approach to identifying the most suitable candidates for preservation. However, there may be rare situations when the status of an individual bridge will require reconsideration if there is an emergency or natural disaster that causes changes to a structure such that it may no longer meet the criteria outlined in this methodology to be a Preservation Priority or Preservation Candidate bridge. Examples of unusual circumstances may include, but are not limited to, the bridge collapsing due to a flood or an overweight vehicle. In these special circumstances, the LADOTD or the bridge owner may request that the FHWA re-evaluate the Preservation Priority or Preservation Candidate Historic Bridge categorization to determine if re-categorization is appropriate. The FHWA will provide the re-categorization results, with appropriate documentation showing how the emergency or natural disaster affected the bridge, to the SHPO for concurrence.

References

American Association of State Highway and Transportation Officials. *Guidelines for Geometric Design of Very Low-Volume Roads*. 2001.

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Louisiana Department of Transportation and Development. *Recording & Coding Guide for the Structure Inventory of the State's Bridges*. Baton Rouge, La.: Louisiana Department of Transportation and Development, 2007 draft, updated 2010.

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Appendix A. Historic Bridges Not Subject to Methodology

Bridges Excluded from Preservation Priority Methodology
Section 106 in Progress

November 5, 2013

Project #	Recall No.	Structure No.	Parish	Bridge Name	Crossing Description (Item 106A)	Facility Carried (Item 7)	Year Completed	Status of 106 Process	Comments
H.002264	000810	02268263900071	Jefferson	KERNER FERRY B.	BAYOU BARATARIA	LA0302	1948	Sec 106 in progress	SHPO 106 meeting in October
H.000263	001390	02360060500001	Orleans	CHEF MENTEUR PASS	CHEF MENTEUR PASS	US0090	1930	MOA in progress	
H.002798	009180	03514083000201	St. Mary	TECHE BAYOU @ OAKLAWN	BAYOU TECHE OAKLAWN	LA0323	1942	MOA in progress	
H.007876	036520	08058051901631	Avoyelles	LA 1177 @ BAYOU BOEUF, S	BAYOU BOEUF	LA1177	1921	MOA signed, Marketing Plan in development	Structure in Poor Condition
H.000577	039520	08400150102341	Rapides	KCS RR @ US 165B (MILITA	KCS RAILROAD	US0165B	1918	Sec 106 in progress	Let date 12/10/2014. Environmental document being prepared by LaFleur. Cultural Assigned to S. Gage. No 106 conducted to date. (H.000577)
	XXXX05		St. Martin	Levert-St. John Bridge	Bayou Teche	ONeal Boudreaux Rd	1920	Listed - Sec 106 in progress	
	200883	P2330019914421	Iberia	Vida Shaw	TECHE BAYOU	LOCAL ROAD	1940	Listed - Sec 106 in progress	
	00060	2260060100001	Jefferson	Huey P. Long	Mississippi River	US00090	1935	Section 106 and rehabilitation completed	Under Rehabilitation; excluded owner (railroad authority)
H.000986	42700	8.58029E+12	Vernon	SABINE RIVER/BURR FERRY	SABINE RIVER @ BURR FERRY	LA0008	1937	TxDOT is lead agency, Section 106 incomplete	
	000930	02290640601401	Lafourche	LOCKPORT COMPANY CANAL	COMPANY CANAL LOCKPORT	LA0001	1959	Eligible for NR	Environmental clearance date 3/31/2013. Has not been let and will need to be re-evaluated. No 106 conducted. No request of re-eval sent to section.
	024430	05370020103111	Ouachita	MISSOURI PACIFIC RAIL/RD	MO PAC RR SICARD	US0080	1935	Standalone MOA	Let date of July 2014.
	017030	04160210100001	De Soto	SABINE RIVER	SABINE RIVER	US0084	1936	TxDOT is lead agency, Programmatic 4(f) completed.	TxDOT already let

Appendix B. AASHTO *Guidelines for Geometric Design of Very Low-Volume Roads* (2001)

Development density	Metric	US Customary
	Total roadway width (m)	Total roadway width (ft)
Low	6.1 to 8.5	20 to 28
Medium	8.5 to 10.3	28 to 34
Note: Low development density represents 2.0 or fewer dwelling units per acre; medium development density represents 2.1 to 6.0 dwelling units per acre.		

Exhibit 2. Guidelines for Total Roadway Width for New Construction of Urban Residential Streets

The lower end of the range of residential street widths in the ITE guidelines presented in Exhibit 2 are applicable to subdivision streets with sufficient off-street parking (e.g., driveways and garages) so that on-street parking is used only occasionally by visitors and delivery vehicles. The higher end of the range of street widths is applicable where there is frequent parking on one side of the street. On streets with frequent parking on both sides of the street, street widths greater than those shown in Exhibit 2 may be appropriate.

Design criteria for curbs and sidewalks on very low-volume urban roads and streets should be determined based on local policies and published guidelines for compliance with the Americans with Disabilities Act (ADA).

Existing Roads

The cross section widths of existing roads need not be modified except in those cases where there is evidence of a site-specific safety problem. Chapter 3 discusses the types of evidence of a site-specific safety problem that might be considered. When a site-specific safety problem that can be mitigated by a wider roadway is identified, the cross section for the portion of the roadway with the identified safety problem should be widened to at least the total roadway widths presented above for new construction.

BRIDGE WIDTH

The key elements in selecting an appropriate bridge width are the width of the adjacent roadway (traveled way and shoulder widths) and, for existing locations, the safety performance of the existing bridge. Determination of bridge widths for newly constructed bridges and existing bridges is addressed below.

New Construction

Newly constructed bridges are bridges on new roadways where there is no existing roadway or bridge in place. The widths of newly constructed bridges should generally be selected in

accordance with the bridge width criteria for local roads in Chapter 5 of the AASHTO *Policy on Geometric Design of Highways and Streets* (**1**). Those criteria state that, for bridges on local roads with ADT of 400 veh/day or less, the bridge width should be equal to the width of the traveled way plus 0.6 m [2 ft]. However, when the entire roadway width (traveled way plus shoulders) is paved, the bridge width should be equal to the total roadway width. Bridge width should be measured between the inside faces of the bridge rail or guardrail. Bridges greater than 30 m [100 ft] in length should be evaluated individually to determine the appropriate bridge width. Bridge usage by trucks and recreational vehicles should also be considered in determining the appropriate width.

One-lane bridges may be provided on single-lane roads and on two-lane roads with ADT less than 100 veh/day where the designer finds that a one-lane bridge can operate effectively. The minimum width of a one-lane bridge should be 4.5 m [15 ft] unless the designer concludes that a narrower bridge can function effectively (e.g., based on the safety performance of similar bridges maintained by the same agency). Caution should be exercised in design of one-lane bridges wider than 4.9 m [16 ft] to assure that drivers will not use them as two-lane structures. Simultaneous arrival of two or more opposing vehicles at a one-lane bridge should be rare, given the low traffic volumes, but one-lane bridges should have intervisible pull-offs at each end where drivers can wait for traffic on the bridge to clear.

Existing Bridges

Existing bridges can remain in place without widening unless there is evidence of a site-specific safety problem related to the width of the bridge. As described in Chapter 3, evidence of a site-specific safety problem may include not only crash history but also other indications such as skid marks, damage to bridge rail or guardrail, and concerns raised by police or local residents. Where an existing bridge needs replacement for structural reasons, but there is no evidence of a site-specific safety problem, the replacement bridge can be constructed with the same width as the existing bridge; this criterion applies to bridges that are reconstructed on the same alignment and bridges that are reconstructed on a more favorable alignment.

HORIZONTAL ALIGNMENT

For balance in roadway design, all geometric elements should, as far as economically practical, be designed to provide safe, continuous operation at a speed likely to be observed under the general conditions for that roadway. For the most part, this is done through the use of design speed as the overall control. In the design of roadway curves, it is necessary to establish proper relation between design speed and curvature and also their joint relations with superelevation and side friction. Although these relations stem from the laws of physics, the actual values for use in design depend on practical limits and factors determined more or less empirically over the range of variables involved.

A key parameter that represents the friction demand for a vehicle traversing a horizontal curve is the side friction factor, which can be estimated as:

Appendix C. LADOTD *Minimum Design Guidelines* (2009)

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Minimum Design Guidelines for Freeways

State law requires that the state highway system conform to these guidelines.

Item No.	Item	Urban		Rural
		F-1	F-2	F-3 [1]
1	Design Speed (mph)	50	60	70
2	Level of Service	C [3]	C [3]	B [2]
3	Number of Lanes (minimum)	4	4	4
4	Width of Travel Lanes (ft)	12	12	12
5	Width of Shoulders (ft)			
	(a) Inside [4]	6	6	6
	(b) Outside [5]	10	10	10
6	Shoulder Type	Paved	Paved	Paved
7	Width of Median (minimum) (ft)			
	(a) Depressed	50	68 (min) – 100 (des)	72 (min) – 100 (des)
	(b) Continuous barrier (4 lane) [6]	15	15	15
	Continuous barrier (6 lane) [6]	27	27	27
8	Fore Slope (vertical – horizontal)	1:4 – 1:6	1:6	1:6
9	Back Slope (vertical – horizontal)	1:4	1:4	1:4
10	Pavement Cross Slope (%)	2.5	2.5	2.5
11	Minimum Stopping Sight Distance (ft)	425	570	730
12	Maximum Superelevation (%) [7]	10	10	10
13	Minimum Radius (ft) [8] (with 10% superelevation)	700	1,100	1,700
14	Maximum Grade (%) [9]	4	3	3
15	Minimum Vertical Clearance (ft) [10]	16	16	16
16	Width of Right-of-Way (ft)			
	(a) Depressed median	As Needed	As Needed	Varies [11]
	(b) Median barrier	As Needed	As Needed	As Needed
	(c) Minimum from edge of bridge structure [12]	15 – 20	15 – 20	15 – 20
17	Bridge Design Live Load [13]	AASHTO	AASHTO	AASHTO
18	Minimum Width of Bridges (face to face of bridge rail at gutter line) (ft)	Roadway Width	Roadway Width	Roadway Width
19	Minimum Clear Zone (from edge of through travel lane) (ft)			
	(a) 1:4 Fore slope	30	N/A	N/A
	(b) 1:6 Fore slope	22	32	34

Approved _____ 12-4-09
Chief Engineer Date

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Footnotes for Minimum Design Guidelines for Freeways

1. These guidelines may be used in urban areas.
2. Level of Service C can be used in urban areas.
3. Level of Service D can be used in heavily developed urban areas.
4. Four feet to be paved, 10 feet to be paved on 6 lane facilities, 12 feet to be paved on 6 lane facilities with truck DDHV greater than 250.
5. Twelve feet paved when truck DDHV is greater than 250.
6. For larger medians two barriers may be required. The maximum offset of 15 feet from barrier to edge of travel lane shall not be exceeded.
7. In Districts 04 and 05, where ice is more frequent, superelevation should not exceed 8 percent from the $e_{max} = 10\%$ table.
8. It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 feet) to provide adequate stopping sight distance on structure.
9. Grades 1 percent higher may be used in urban areas.
10. An additional 6 inches should be added for additional future surfacing. Seventeen feet is required for trusses and pedestrian overpasses.
11. As needed for urban projects: 300 feet to 330 feet for rural projects depending on median width.
12. Twenty-five feet shall generally be provided in accordance with EDSM II.1.1.1.
13. LRFD for bridge design.

General Note:

DOTD pavement preservation minimum design guidelines or 3R minimum design guidelines (separate sheets) shall be applicable to those projects for which the primary purpose is to improve the riding surface.

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Minimum Design Guidelines for Rural Arterial Roads

State law requires that the state highway system conform to these guidelines.

Item No.	Item	Rural		
		RA-1	RA-2	RA-3
1	Design Speed (mph)	50 [1]	60 [2]	70
2	Number of Lanes (minimum) [3]	2	2	4
3	Width of Travel Lanes (ft)	11 – 12 [4]	12	12
4	Width of Shoulders (minimum) (ft)			
	(a) Two Lane	8 [5]	8 [5]	N/A
	(b) Divided facilities			
	(1) Inside [8]	4	4	4 [6]
	(2) Outside	8 [5]	8 [5]	8 – 10 [7]
5	Shoulder Type	Aggregate (2' min paved)	Aggregate (2' min paved)	Aggregate [8] (2' min paved)
6	Parking Lane Width (ft)	N/A	N/A	N/A
7	Width of Median on Divided Facilities (ft)			
	(a) Depressed	42 – 60	42 – 60	60
	(b) Raised	N/A	N/A	N/A
	(c) Two way left turn lane	N/A	N/A	N/A
8	Fore slope (vertical – horizontal)	1:6	1:6	1:6
9	Back slope (vertical – horizontal)	1:4	1:4	1:4
10	Pavement Cross-slope (%)	2.5	2.5	2.5
11	Minimum Stopping Sight Distance (ft)	425	570	730
12	Maximum Superelevation (%) [9]	10	10	10
13	Minimum Radius (ft) [10] (with full superelevation)	700	1,100	1,700
14	Maximum Grade (%) [11]	4	3	3
15	Minimum Vertical Clearance (ft) [12]	16	16	16
16	Minimum Clear Zone (ft) (from edge of through travel lane)	20	30 [13]	34
17	Bridge Design Live Load [14]	AASHTO	AASHTO	AASHTO
18	Width of Bridges (min) (face to face of bridge rail at gutter line) (ft)	Roadway width	Roadway width	Roadway width

Approved _____ 12-4-09
Chief Engineer Date

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Footnotes for Minimum Design Guidelines for Rural Arterial Roads

1. The design speed may not be less than the current posted speed of the overall route.
2. Consider using RA-3 criteria (except Item No. 2) for roadways that will be widened in the future.
3. Consider increasing to a 4-lane facility if design volume is greater than 6,000 vehicles per day and six lanes if design volume is greater than 25,000 vehicles per day. If more than two lanes are to be provided, outside shoulders should be paved.
4. Twelve feet required when design ADT is 1,500 or greater.
5. Six foot shoulders are allowed if design volume is between 400 to 2,000 vehicles per day. Four foot shoulders are allowed if design volume is less than 400 vehicles per day.
6. Eight to ten feet to be provided on six lane facilities.
7. Consider using 10 foot outside shoulders where trucks are greater than 10 percent or if large agricultural vehicles use the roadway.
8. For ADT 5,000 or greater, the full shoulder width shall be paved.
9. In Districts 04 and 05, where ice is more frequent, superelevation should not exceed 8 percent from the e_{max} = 10 percent table.
10. It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 feet) to provide adequate stopping sight distance on structure.
11. Grades 1 percent higher are permissible in rolling terrain.
12. An additional 6 inches should be added for additional future surfacing.
13. On multilane facilities, use 32 feet.
14. LRFD for bridge design.

General Note:

DOTD pavement preservation minimum design guidelines or 3R minimum design guidelines (separate sheets) shall be applicable to those projects for which the primary purpose is to improve the riding surface.

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Minimum Design Guidelines for Urban Arterial Roads and Streets

State law requires that the state highway system conform to these guidelines.

Item No.	Item	Urban				
		UA-1	UA-2	UA-3	UA-4	UA-5
1	Design Speed (mph)	40	45	50	55	60
2	Level of Service [1]	C	C	C	C	C
3	Number of Lanes	2 (min) – 4 (typ)	2 (min) – 4 (typ)	2 (min) – 4 (typ)	2 (min) – 4 (typ)	2 (min) – 4 (typ)
4	Width of Travel Lanes (ft)	11	11 – 12	12	12	12
5	Width of Shoulders (minimum) (ft) [2]					
	(a) Inside on multilane facilities	N/A	N/A	4	4	4
	(b) Outside	8	8	8	8	8
6	Shoulder Type	Paved	Paved	Paved	Paved	Paved
7	Parking Lane Width (ft)	10 – 12	10 – 12	N/A	N/A	N/A
8	Width of Median on Multilane Facilities (ft)					
	(a) Depressed	N/A	N/A	30	34 – 42	42
	(b) Raised	6 [3] – 30	6 [3] – 30	30	30	30
	(c) Two way left turn lane	11 – 14 typ. [4]	11 – 14 typ. [4]	N/A	N/A	N/A
9	Width of Sidewalk (minimum) (where used) (ft) [5]					
	(a) When offset from curb	4	4	4	4	4
	(b) When adjacent to curb	6	6	N/A	N/A	N/A
10	Fore slope (vertical – horizontal)	1:3 (min) – 1:4 (des)	1:3 (min) – 1:4 (des)	1:4	1:6	1:6
11	Back slope (vertical – horizontal)	1:3	1:3	1:3	1:4	1:4
12	Pavement Cross-slope (%)	2.5	2.5	2.5	2.5	2.5
13	Min. Stopping Sight Distance (ft)	305	360	425	495	570
14	Maximum Superelevation (%)	4	4	4	6	6
15	Minimum Radius (ft) [6,7]					
	(a) With normal crown (-2.5% cross-slope)	700	1,000	16,700	19,700	22,880
	(b) With 2.5% superelevation	550	750	3,500	5,250	6,280
	(c) With full superelevation	500	700	1,000	1,100	1,400
16	Maximum Grade (%)	7	6	6	5	5
17	Minimum Vertical Clearance (ft) [8]	16	16	16	16	16
18	Minimum Clear Zone (ft)					
	(a) From edge of through travel lane	18 [9]	24 [9]	28 [10]	22	30
	(b) Outside from back of curb (when curb is used)	6 (min) – 16 (des) [11]	6 (min) – 22 (des) [11]	19 [10]	13	21
	(c) Median from back of curb [12] (when curb is used)	4 (min) – 12 (des)	4 (min) – 18 (des)	8 (min) – 17 (des)	8 (min) – 17 (des)	8 (min) – 25 (des)
19	Bridge Design Live Load [13]	AASHTO	AASHTO	AASHTO	AASHTO	AASHTO
20	Width of Bridges (minimum) (face to face of bridge rail at gutter line) (ft)					
	(a) Curbed facilities (without sidewalks)	Traveled way plus 8′ [14]	Traveled way plus 8′ [14]	Roadway width	Roadway width	Roadway width
	(b) Shoulder facilities	Roadway width	Roadway width	Roadway width	Roadway width	Roadway width
21	Guardrail Required at Bridge Ends	[14]	[14]	Yes	Yes	Yes

Approved _____ 12-4-09
Chief Engineer Date

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Footnotes for Minimum Design Guidelines for Urban Arterial Roads and Streets

1- Level of service D allowable in heavily developed urban areas.
2- Curb may be used in place of shoulders on UA-1 and UA-2 facilities. If used on UA-3, UA-4, or UA-5 facilities, curb should be placed at the edge of shoulder. For design speeds greater than 45 mph, curb will not be placed in front of guardrail.
3- With Chief Engineer's approval, curb offsets may be eliminated and the minimum median width can be reduced to 4 feet. On principal arterials, particularly at intersections, the upper limit should be considered.
4- Cannot be used on multilane roadways (with four or more through lanes) without the Chief Engineer's approval.
5- Sidewalks must be separated from the shoulder and should be placed as near the right of way line as possible. On high speed facilities, they should preferably be placed outside the minimum clear zone shown in item 18.
6- It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 feet) to provide adequate stopping sight distance on structure.
7- The following radii apply at divisional islands. The radius selected must match the design speed of the road. These radii also apply to the other guidelines where divisional islands are mentioned.

Design Speed	Radius (rounded)	Degree of Curve
20 mph	1,450′	4°
25 mph	1,650′	3° 30′
30 mph	1,950′	3°
35 mph	2,300′	2° 30′

Design Speed	Radius (rounded)	Degree of curve
40 mph	2,900′	2°
45 mph	3,850′	1° 30′
50 mph	5,750′	1°
55 & 60 mph	11,500′	0° 30′

8- An additional 6 inches should be added for additional future surfacing.
9- Applies to facilities with shoulders. Refer to the Roadside Design Guide when 1:3 fore slopes are used or for slopes flatter than 1:4.
10- The distance may be reduced by 6 feet if 1:6 slopes are used. For outside shoulders wider than 8 feet, further reduction should be proportional to the added shoulder width.
11- If outside shoulders and curb are used, refer to the Roadside Design Guide.
12- Where left turn lanes are provided or where the median is less than 6 feet in width, the minimum clearance will be 1.5 feet from back of curb. For median slopes steeper than 1:6, refer to the Roadside Design Guide for the desirable clear zone.
13- LRFD for bridge design.
14- Refer to EDSM II.3.1.4 when sidewalks will be provided and for guardrail requirements.

General Note:

DOTD pavement preservation minimum design guidelines or 3R minimum design guidelines (separate sheets) shall be applicable to those projects for which the primary purpose is to improve the riding surface.

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Minimum Design Guidelines for Suburban Arterial Roads and Streets

State law requires that the state highway system conform to these guidelines.

Item No.	Item	Suburban [1]	
		SA-1	SA-2
1	Design Speed (mph)	50	55
2	Level of Service	C	C
3	Number of Lanes	2 (min) – 4 (typ)	2 (min) – 4 (typ)
4	Width of Travel Lanes (ft)	12	12
5	Width of Shoulders (minimum) (ft) [2]		
	(a) Inside on multilane facilities	4	4
	(b) Outside	8	8
6	Shoulder Type	Paved	Paved
7	Parking Lane Width (ft)	N/A	N/A
8	Width of Median on Multilane Facilities (ft)		
	(a) Depressed	30 – 42	42
	(b) Raised	30	30
	(c) Two way left turn lane	N/A	N/A
9	Width of Sidewalk (minimum) (where used) (ft) [3]		
	(a) When offset from curb	4	4
	(b) When adjacent to curb	N/A	N/A
10	Fore slope (vertical – horizontal)	1:4 – 1:6	1:6
11	Back slope (vertical – horizontal)	1:3	1:4
12	Pavement Cross-slope (%)	2.5	2.5
13	Minimum Stopping Sight Distance (ft)	425	495
14	Maximum Superelevation (%)	4	6
15	Minimum Radius (ft) [4, 5]		
	(a) With normal crown (-2.5% cross-slope)	16,700	19,700
	(b) With 2.5% superelevation	3,500	5,250
	(c) With full superelevation	1,000	1,100
16	Maximum Grade (%)	4 [6]	4
17	Minimum Vertical Clearance (ft) [7]	16	16
18	Minimum Clear Zone (ft)		
	(a) From edge of through travel lane	20 – 28 [8]	24
	(b) Outside from back of curb (when curb is used)	10 (1:6) 18 (1:4)	14
	(c) Median from back of curb (when curb is used)	12	18
19	Bridge Design Live Load [9]	AASHTO	AASHTO
20	Width of Bridges (minimum) (face to face of bridge rail at gutter line) [10]		
	(a) Curbed facilities (without sidewalks)	Roadway width	Roadway width
	(b) Shoulder facilities	Roadway width	Roadway width
21	Guardrail Required at Bridge Ends	Yes	Yes

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Chief Engineer Date

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Footnotes for Minimum Design Guidelines for Suburban Arterial Roads and Streets

1. These guidelines may be used only on a rural roadway section that adjoins a roadway section currently classified as urban. The classification selected should be based on the posted speed.
2. If curb is used, it shall be placed at the edge of shoulder on two lane facilities and 1 foot beyond the edge of the shoulders on multilane facilities. However, see EDSM II.2.1.7. Curb will not be placed in front of guardrail.
3. Sidewalks must be separated from the shoulder and should be placed as near the right of way line as possible. They should desirably be placed outside the minimum clear zone shown in Item 18.
4. It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 feet) to provide adequate stopping sight distance on structure.
5. Different radii apply at divisional islands. See Footnote 7 for "Minimum Design Guidelines for Urban Arterial Roads and Streets.
6. Grades 1 percent higher are permissible in rolling terrain.
7. An additional 6 inches should be added for additional future surfacing.
8. Use the larger value when 1:4 fore slopes are used.
9. LRFD for bridge design
10. For roadways with shoulders and curbs, consider widening each bridge 8 feet to allow for a future lane and 4 foot offsets to bridge rail.

General Note:

DOTD pavement preservation minimum design guidelines or 3R minimum design guidelines (separate sheets) shall be applicable to those projects for which the primary purpose is to improve the riding surface.

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Minimum Design Guidelines for Rural Collector Roads

State law requires that the state highway system conform to these guidelines.

Item No.	Item	Rural		
		RC-1	RC-2	RC-3
1	Average Daily Traffic [1]	Under 400	400 – 2000	Over 2000
2	Design Speed (mph)	40 – 60 [2]	50 – 60 [2]	60
3	Number of Lanes	2	2	2 – 4 [3]
4	Width of Travel Lanes (ft)	11	11 – 12 [4]	12
5	Width of Shoulders (ft)			
	(a) Inside on multilane facilities	N/A	N/A	4
	(b) Outside	2 [5]	4 – 5 [6]	8
6	Shoulder Type	Paved	Aggregate (2' min paved)	Aggregate (2' min paved) [7]
7	Width of Parking Lanes (ft)	N/A	N/A	N/A
8	Width of Median on multilane facilities (ft)			
	(a) Depressed	N/A	N/A	42 – 60
	(b) Raised	N/A	N/A	N/A
	(c) Two way left turn lane	N/A	N/A	N/A
9	Width of Sidewalk (minimum) (ft)			
	(a) When offset from curb	N/A	N/A	N/A
	(b) When adjacent to curb	N/A	N/A	N/A
10	Fore Slope (vertical – horizontal)	1:4	1:4	1:6
11	Back Slope (vertical – horizontal)	1:4 [8]	1:4	1:4
12	Pavement Cross Slope (%)	2.5	2.5	2.5
13	Min. Stopping Sight Distance (ft)	305 (40 mph) 425 (50 mph) 570 (60 mph)	425 (50 mph) 570 (60 mph)	570
14	Maximum Superelevation (%) [9]	10	10	10
15	Minimum Radius (ft) [10] (with full superelevation)	450 [11]	700 [12]	1,100
16	Maximum Grade (%)	7 (40 mph) 6 (50 mph) 5 (60 mph)	6 (50 mph) 5 (60 mph)	5
17	Minimum Vertical Clearance (ft) [13]	15	15	15
18	Minimum Clear Zone (ft) (from edge of through travel lane)	10, 14, 24 [14]	26 (50 mph) 32 (60 mph)	30
19	Bridge Design Live Load [15]	AASHTO	AASHTO	AASHTO
20	Minimum Width of Bridges (face to face of bridge rail at gutter line) (ft)	30	Roadway width	Roadway width

Approved _____ Chief Engineer

12-4-09 Date

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Footnotes for Minimum Design Guidelines for Rural Collector Roads

1- Current traffic may be used to determine the appropriate classification.
2- The design speed may not be less than the current posted speed of the overall route.
3- For rolling terrain, limited passing sight distance and high percentage of trucks, further analysis should be made to determine if additional lanes are required when ADT is above 7,000.
4- For design speeds greater than 50 mph and ADT greater than 1,500 use 12-foot lanes.
5- Where bicycle activity is observed, a 4-foot shoulder should be provided.
6- For ADT greater than 1,500 use 6 foot shoulders.
7- For ADT of 5,000 or greater, a minimum of 4 foot must be paved.
8- 1:3 back slopes are allowed where right-of-way restrictions dictate.
9- In Districts 04 and 05, where ice is more frequent, superelevation should not exceed 8 percent from the $e_{max} = 10\%$ table.
10- It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 feet) to provide adequate stopping sight distance on structure.
11- Radius based on 40 mph. Radii for 50 mph and 60 mph are shown under the RC-2 and RC-3 classifications respectively.
12- Radius based on 50 mph. The radius for 60 mph is shown under the RC-3 classification.
13- Where the roadway dips to pass under a structure, a higher vertical clearance may be necessary. An additional 6 inches should be added for additional future surfacing.
14- The lower value is based on a 40 mph design speed, the middle value for 50 mph and the upper value for 60 mph.
15- LRFD for bridge design.

General Note:

DOTD pavement preservation minimum design guidelines or 3R minimum design guidelines (separate sheets) shall be applicable to those projects for which the primary purpose is to improve the riding surface.

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Minimum Design Guidelines for Urban and Suburban Collector Roads and Streets

State law requires that the state highway system conform to these guidelines.

Item No.	Item	Urban		Suburban [1]		
		UC-1	UC-2	SC-1	SC-2	SC-3
1	Average Daily Traffic	N/A	N/A	N/A	N/A	N/A
2	Design Speed (mph)	30 – 40	45	40	45	50
3	Number of Lanes (minimum)	2 – 4	2 – 4	2 – 4	2 – 4	2 – 4
4	Width of Travel Lanes (ft)	11 – 12	12 [2]	11	11	11 – 12 [2]
5	Width of Shoulders (ft)					
	(a) Inside on multilane facilities	N/A	N/A	N/A	N/A	4 [3]
	(b) Outside	8 [2, 4]	8 [2, 4]	4 – 5 [4]	4 – 5 [4]	6, 8 [5]
6	Shoulder Type	Paved	Paved	Paved	Paved	Paved
7	Width of Parking Lanes (where used) (ft)	7 – 10 [6]	11	7 – 10 [6]	11	N/A
8	Width of Median on multilane facilities (ft)					
	(a) Depressed	N/A	N/A	N/A	N/A	30
	(b) Raised	4 (min) – 30 (des)	4 (min) – 30 (des)	4 (min) – 30 (des)	4 (min) – 30 (des)	26
	(c) Two way left turn lane	11 – 14 typ. [7]	11 – 14 typ. [7]	11 – 14 typ. [7]	11 – 14 typ. [7]	N/A
9	Width of Sidewalk (minimum) (where used) (ft) [8]					
	(a) When offset from curb	4	4	4	4	4
	(b) When adjacent to curb	6	6	6	6	N/A
10	Fore Slope (vertical – horizontal)	1:3 – 1:4 [9]	1:3 – 1:4 [9]	1:4	1:4	1:4
11	Back Slope (vertical – horizontal)	1:3 [10]	1:3	1:3	1:3	1:3
12	Pavement Cross Slope (%)	2.5	2.5	2.5	2.5	2.5
13	Min. Stopping Sight Distance (ft)	200 (30 mph) 305 (40 mph)	360	305	360	425
14	Maximum Superelevation (%)	4	4	4	4	6
15	Minimum Radius (ft) [11, 12]					
	(a) With normal crown (-2.5% cross slope)	325 (30 mph) 700 (40 mph)	1,000	700	1,000	16,700
	(b) With 2.5% superelevation	250 (30 mph) 550 (40 mph)	750	550	750	4,400
	(c) With full superelevation	235 (30 mph) 500 (40 mph)	700	500	700	900
16	Maximum Grade (%)	9	8	7	6	6
17	Minimum Vertical Clearance (ft) [13]	15	15	15	15	15
18	Minimum Clear Zone (ft)					
	(a) From edge of through travel lane	10	10	10	10	26 – 28 [14]
	(b) Outside from back of curb (when curb is used)	1 (min) – 6 (des)	6 (min) – 8 (des)	1 (min) – 6 (des)	6 (min) – 8 (des)	17 – 19 [15]
	(c) Median from back of curb (when curb is used)	1 (min) – 6 (des)	1 (min) – 8 (des)	1 (min) – 6 (des)	1 (min) – 8 (des)	13
19	Bridge Design Live Load [16]	AASHTO	AASHTO	AASHTO	AASHTO	AASHTO
20	Minimum Width of Bridges (face to face of bridge rail at gutter line)					
	(a) Curbed facilities (without sidewalks)	Traveled way plus 8' [17]	Traveled way plus 8' [17]	Traveled way plus 8' [17]	Traveled way plus 8' [17]	Roadway width
	(b) Shoulder facilities	Roadway width	Roadway width	Roadway width	Roadway width	Roadway width
21	Guardrail Required at Bridge Ends	[17]	[17]	[17]	[17]	Yes

Approved _____ Chief Engineer

12-4-09 Date

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Footnotes for Minimum Design Guidelines for Urban and Suburban Collector Roads and Streets

1- These guidelines may be used only on a rural roadway section that adjoins a roadway section currently classified as urban. The classification selected should be based on the posted speed.
2- For ADT less than 2,000 refer to Exhibit 6-5 on page 425 in the '2004 AASHTO Policy on Geometric Design of Highways and Streets'.
3- Applicable to depressed medians only.
4- Curb may be used instead of shoulder. Where bicycle activity is observed, a bike lane should be considered.
5- If curb will not be used, shoulder widths may be reduced, see Footnote 2. When curb is used on mainline facilities, it shall be placed at the edge of shoulder. When curb is used on 2-lane facilities, 8 foot shoulders will be required if a future center turn lane will be added. Curb will not be placed in front of guardrail.
6- Seven and 8-foot widths are limited to residential areas for 30 and 40 mph respectively.
7- Cannot be used on multilane roadways (with four or more through lanes) without Chief Engineer's approval.
8- If shoulders are used, sidewalks should be separated from shoulder.
9- Where shoulders are used, 1:4 minimum fore slopes are required through the limits of minimum clear zone.
10- 1:2 back slopes are allowed where right of way restrictions dictate.
11- It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 feet) to provide adequate stopping sight distance on structure.
12- Different radii apply at divisional islands. See Footnote 7 for "Minimum Design Guidelines for Urban Arterial Roads and Streets".
13- Where the roadway dips to pass under a structure, a higher vertical clearance may be necessary. An additional 6 inches should be added for additional future surfacing.
14- The higher value is applicable to roadways with an ADT greater than 6,000.
15- These values apply to roadways with 8-foot shoulders. For outside shoulders less than 8 feet, further increase should be proportional to the reduced shoulder width.
16- LRFD for bridge design.
17- Refer to EDSM II.3.1.4 when sidewalks will be provided and for guardrail requirements.

General Note:

DOTD pavement preservation minimum design guidelines or 3R minimum design guidelines (separate sheets) shall be applicable to those projects for which the primary purpose is to improve the riding surface.

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Minimum Design Guidelines for Local Roads and Streets

State law requires that the state highway system conform to these guidelines.

Item No.	Item	Rural			Urban	
		RL-1	RL-2	RL-3	UL-1	UL-2
1	Design Speed (mph) [1]	30	40	50	20	30
2	Average Daily Traffic	0 – 250	250 – 400	Over 400	N/A	N/A
3	Typical Number of Lanes	2	2	2	2	2
4	Minimum Width of Travel Lanes (ft)	9	9	11 – 12 [2]	10 – 11 [3]	10 – 11 [3]
5	Minimum Width of Shoulders (ft) [4]	2	2	5 – 8 [5]	When used [6]	When used [6]
6	Shoulder Type	Aggregate	Aggregate	Aggregate	Paved	Paved
7	Minimum Width of Parking Lanes (where used) (ft)	N/A	N/A	N/A	7 – Residential 8 – Industrial	7 – Residential 8 – Industrial
8	Minimum Width of Sidewalk (where used) (ft)					
	(a) When offset from curb	N/A	N/A	N/A	4	4
	(b) When adjacent to curb	N/A	N/A	N/A	6	6
9	Fore Slope (vertical – horizontal)	1:3 [7]	1:3 [7]	1:4	1:3	1:3
10	Back Slope (vertical – horizontal)	1:2	1:2	1:3	1:2	1:2
11	Pavement Cross Slope (%)	2.5	2.5	2.5	2.5	2.5
12	Min. Stopping Sight Distance (ft)	200	305	425	115	200
13	Maximum Superelevation (%)	10 [8]	10 [8]	10 [8]	4	4
14	Minimum Radius (ft) [9, 10]					
	(a) With normal crown (-2.5% cross slope)	7,585	11,625	16,700	100	325
	(b) With 2.5% superelevation	1,930	3,250	5,000	85	250
	(c) With full superelevation	250	450	700	80	235
15	Maximum Grade (%) [11]	7	7	6	10	9
16	Minimum Vertical Clearance (ft)	15	15	15	15	15
17	Minimum Clear Zone (ft)					
	(a) From edge of though travel lane	10 [7]	10 [7]	Varies [12]	7 – Shoulder facilities	10 – Shoulder facilities
	(b) From back of curb (when curb is used)	N/A	N/A	N/A	1 (min) – 6 (des)	1 (min) – 6 (des)
18	Bridge Design Live Load [13]	AASHTO	AASHTO	AASHTO	AASHTO	AASHTO
19	Minimum Width of Bridges (face to face of bridge rail at gutter line)	Traveled way plus 4'	Traveled way plus 4'	Traveled way plus 6' [14]	Traveled way plus 8' [15, 16]	Traveled way plus 8' [15, 16]
20	Bridge End Treatment	Yes	Yes	Yes	[16]	[16]

Approved _____ Chief Engineer

12-4-09 Date

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Footnotes for Minimum Design Guidelines for Local Roads and Streets

1- The design speed may not be less than the current posted speed of the overall route.
2- For ADT greater than 2,000, use 12-foot lane widths.
3- Lane widths in residential areas may be reduced to 9 feet if necessary. Twelve foot lane widths are preferred in industrial areas.
4- Where bicycle activity is prevalent, a paved 4-foot shoulder should be provided.
5- For ADT less than 1,500, the minimum shoulder width may be reduced to 4 feet if necessary. For ADT 1,500 to 2,000, use 6-foot shoulders. For ADT over 2,000, use 8-foot shoulders.
6- Select the shoulder width that corresponds to the ADT shown in the rural local road guidelines.
7- The value shown should be provided on new roadways. A lesser value may be used on existing roads depending on soil stability, right-of-way constraints, the safety record of the road, and the size vehicles using the road. Guidance is available in the AASHTO publication titled 'Guidelines for Geometric Design of Very Low Volume Local Roads (ADT $\leq$ 400)'.
8- In Districts 04 and 05, where ice is more frequent, superelevation should not exceed 8 percent from the emax = 10% table.
9- It may be necessary to increase the radius of the curve and/or increase the shoulder width (maximum of 12 feet) to provide adequate stopping sight distance on structure.
10- On roadways with an ADT $\leq$ 400, a sharper radius may be used on fully superelevated roadways if necessary. For specific values refer to the AASHTO publication titled 'Guidelines for Geometric Design of Very Low Volume Local Roads (ADT $\leq$ 400)'. Different radii apply at divisional islands.
11- Grades 2 percent higher may be used in rural rolling terrain.
12- Varies from 14 feet to 28 feet. Refer to the Roadside Design Guide for the applicable value. For spot replacement projects refer to footnote 7.
13- LRFD for bridge design.
14- For ADT greater than 2,000, use roadway width.
15- Refer to EDSM II.3.1.4 when sidewalks will be provided and for guardrail requirements.
16- When shoulders are provided, the minimum bridge width shall be the larger of that shown or the roadway width.

General Local Road Notes:

These guidelines shall not apply to:

a. Dead end roads (open at one end only).
b. Roads that are dependent on dead end roads for access.

Urban guidelines may be applied to any street for which curb is to be used and the posted speed is less than 50 mph, or any street for which a posted speed of 30 mph or less would be appropriate.

On spot replacement projects the existing geometry and superelevation may remain providing there are no safety problems.

The appropriate local governing body is authorized to make design exceptions for specific items listed in these guidelines, with proper engineering justification.

General Note:

DOTD pavement preservation minimum design guidelines or 3R minimum design guidelines (separate sheets) shall be applicable to those projects for which the primary purpose is to improve the riding surface.

Appendix D. *Secretary of the Interior's Standards for the Treatment of Historic Properties,* as Adapted for Historic Bridges

Secretary of the Interior's Standards for the Treatment of Historic Properties, as Adapted for Historic Bridges

Adapted from: Clark, Kenneth M., Grimes, Mathew C., and Ann B. Miller, *Final Report, A Management Plan for Historic Bridges in Virginia*, Virginia Transportation Research Council, 2001.

The Secretary of the Interior's Standards for the Treatment of Historic Properties, first codified in 1979 and revised in 1992, have been interpreted and applied largely to buildings rather than engineering structures. In this document, the differences between buildings and structures are recognized and the language of the Standards has been adapted to the special requirements of historic bridges.

1. Every reasonable effort shall be made to continue an historic bridge in useful transportation service. Primary consideration should be given to rehabilitation of the bridge on site. Only when this option has been fully exhausted shall other alternatives be explored.

2. The original character-defining qualities or elements of a bridge, its site, and its environment should be respected. The removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided.

3. All bridges shall be recognized as products of their own time. Alterations that have no historical basis and that seek to create a false historical appearance shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive engineering and stylistic features, finishes, and construction techniques or examples of craftsmanship that characterize an historic property shall be preserved.

6. Deteriorated structural members and architectural features shall be retained and repaired, rather than replaced. Where the severity of deterioration requires replacement of a distinctive element, the new element should match the old in design, texture, and other visual qualities and where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical and physical treatments that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the most environmentally sensitive means possible.

8. Significant archaeological and cultural resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, structural reinforcements, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Appendix E. Sample Condition Score Calculation

LADOTD- Louisiana Historic Bridge Inventory Priority Bridge Evaluation Matrix to Calculate Condition Score

Mead&Hunt

	Recall Number		Structure Number			
	001030		02294070100001			
	Structure Type:	315	Lift - span tower	Steel Vertical Lift Span		
	Location:	BAYOU LAFOURCHE	Lafourche	Parish		
NBI Number	Criteria				NBI Number	Assessment
64B	Structural Capacity (Tons)				52	10.0
59	NBI Superstructure Rating				6	6.0
60	NBI Substructure Rating				6	6.0
51/29	Roadway Width Compared to ADT (NBI Factor H)				8	5.0
51/32	Approach Width Compared to Bridge Roadway Width					10.0
68	NBI Deck Geometry Evaluation				4	4.0
71	Waterway Adequacy				8	8.0
72	NBI Approach Roadway Alignment Evaluation				8	8.0
61	Channels and Channel Protection (scour)				7	7.0
67	NBI Structural Evaluation				6	6.0

Total Condition Score	**70.0**
Sufficiency Rating	**83.9**

Appendix F. Sample Application of Additional Considerations

Preservation Priority/ Preservation Candidate/ Non-Priority Methodology

Recall Number: 001030
Bridge type: Lift - Span Tower
Parish: Lafourche
Feature Carried: LA0308
Feature Crossed: Bayou Lafourche

Additional Considerations

CHECK 1. Rehabilitation

- ☐ Rehabilitation that follows Secretary of the Interior's Standards
- ☒ Rehabilitation not anticipated

CHECK 2. Geometrics

- ☐ Meets AASHTO Low Volume Standards
- ☒ Meets Louisiana Minimum Design Standards or Satisfactory Geometrics

Considers:
Current ADT (29) = 2,300
Roadway Width (51) = 28.0 feet
Approach Roadway Width (32) = 28.0 feet

CHECK 3. Load

- ☒ Within 90% of Acceptable Live Load Capacity

Considers:
Structural Capacity (64B) = 52 tons

CHECK 4. Detour

- ☒ Acceptable Detour (< 10 Miles) for Load Posted Road

Considers:
Posted (41) = No
Bypass/Detour (19) = N/A (8 miles)

CHECK 5. Navigation Control

- ☒ Navigation Control Required and Adequate

Considers:
Navigation Control (38) = Required
Pier Protection (111) = Adequate
Horizontal Navigation Clearance (40) = 81 feet
Vertical Navigation Clearance (39) = 70 feet
USCG - Vertical = Unknown
USCG - Horizontal = Unknown

Mead & Hunt