



U.S. Department of Transportation
Federal Highway Administration
Office of Infrastructure

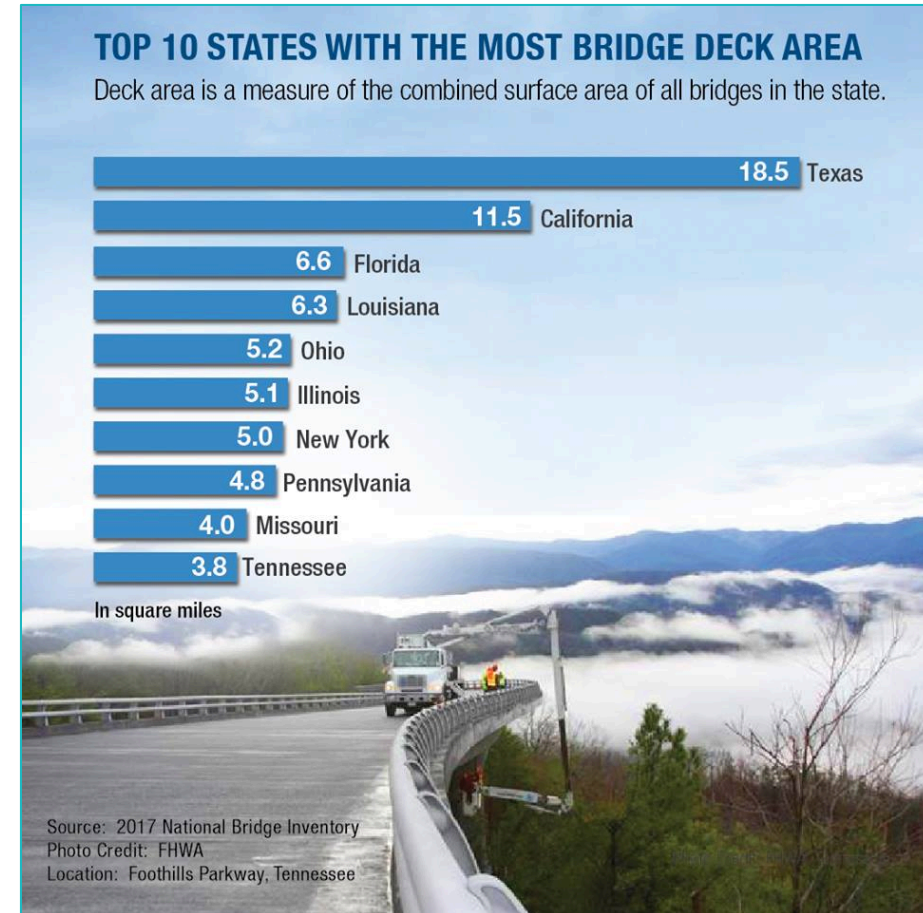
Review of Proposed Changes to the National Bridge Inspection Standards (NBIS)



FHWA is the source of all images unless otherwise noted.

Outline

- Reason for changing
- Section-by-section discussion
- Specifications for the National Bridge Inventory
- How to comment
- <https://www.regulations.gov/docket?D=FHWA-2017-0047>
- Comment period closes January 13, 2020



Reasons for Change

- Required by MAP-21
 - Update methodology, training, and qualifications for inspectors
 - Update frequency of inspection, including a risk-based approach
 - Establish procedures for reporting and monitoring of critical findings
 - Establish national certification of bridge inspectors
 - Ensure uniformity of the inspections and evaluations (NBIS and National Tunnel Inspection Standards)
- Incorporates changes and lessons learned since last (2004) update
 - Element data
 - Load rating vehicles
 - Clarifications
 - Fill gaps
 - Address other questions and requests for change

650.303 Applicability

- Include private owned bridges that are connected to a public road on both sides of the bridge
- Include tribally owned bridges



Source: Michael Baker International

650.305 Definitions

- Clarify existing definitions
- Introduce definitions for new terms
- Delete definitions that are no longer needed
- In several cases, the changes in definitions are aligned with the NTIS

650.307 Bridge inspection organization responsibilities

- States, Federal agencies, and tribal governments are responsible for proper inspection and evaluation of all highway bridges
- Tribal governments may consult with Bureau of Indian Affairs (BIA); can delegate responsibilities
- Border bridges need joint written agreements

650.307 Bridge inspection organization responsibilities

- Clarify new and existing responsibilities
 - Maintain a central registry of national certified bridge inspectors
 - Perform quality control and quality assurance activities
 - Manage scour appraisals and plans of actions
- Document delegated functions
- Allow for more than one Program Manager (PM)
 - A lead PM must be identified, if more than one
 - BIA can serve as the PM for tribal governments

650.309 Qualifications of Personnel

Program Manager

- Registered professional engineer, or
- 10 years of experience

Team Leader

- Registered P.E. + **6 months of experience**
- 5 years of experience
- Bachelor's degree, pass Fundamentals of Engineering exam, and 2 years of experience
- Associate's degree and 4 years of experience
- **NICET training deleted as an option**

650.309 Qualifications of Personnel

- Requires comprehensive bridge inspection and refresher training for Program Managers and Team Leaders
 - Made definition more robust with expectation that any alternate training would apply nationally
 - 70% score required for comprehensive bridge inspection end-of-course assessment
 - 18 hours of refresher training over each 60 months
- Maintain documentation of qualifications

650.309 Qualifications of Personnel

- Team leaders for nonredundant steel tension member (NSTM) inspections must have NSTM inspection training
- Underwater divers must have underwater bridge inspection training



650.311 Inspection Interval

- All intervals are proposed to be risk based
 - Method 1: simplified assessment of risk
 - Method 2: more rigorous assessment of risk
 - Similar to approach outlined in NCHRP Report 782 based on NCHRP 12-82



Source: Michael Baker International

650.311 Inspection Interval

- Routine inspection interval
 - Method 1:
 - Basic 24-month interval (as today)
 - Less than 24-month interval
 - Specific criteria added for some bridges to not exceed a 12-month interval
 - Greater than 24-month interval, up to 48 months following similar criteria in 1988 Technical Advisory
 - No more FHWA approvals

650.311 Inspection Interval

- Routine inspection interval
 - Method 2: Can result in 12, 24, 48, and 72-month intervals
 - More rigorous process outlined, requirements include:
 - Risk Assessment Panel (RAP) developed policy
 - Risk categories, probability & consequence levels defined
 - Damage modes and attributes defined
 - Classification of each bridge into 1 of 4 risk categories
 - Risk process, criteria, & intervals documented
 - Requires FHWA approval

650.311 Inspection Interval

- Underwater inspection interval
 - Method 1:
 - Basic 60-month interval (as today)
 - Less than 60-month interval
 - Established criteria for some bridges to not exceed a 36-month interval
 - Greater than 60-month interval, up to 72 months following criteria like routine inspection extended intervals
 - Method 2: Can result in 36, 60, and 72-month intervals

650.311 Inspection Interval

- NSTM inspection interval
 - Method 1:
 - Basic 24-month interval (as today)
 - Less than 24-month interval
 - Established criteria for some bridges to not exceed a 12-month interval
 - Greater than 24-month interval, up to 48 months following criteria like routine inspection extended intervals
 - Method 2: Can result in 12, 24, and 48-month intervals

650.311 Inspection Interval

- Bridge inspection interval tolerance
 - Up to three months after inspection due date
- Next inspection due date
 - Establish after each inspection based on last inspection date and scheduled interval
- Example: Inspection due June 2019 and on 24-month interval
 - Inspect in April 2019 – Good, next inspection due April 2021
 - Inspect in September 2019 – Good (within tolerance), next inspection due September 2021
 - Inspect in October 2019 – No good (beyond tolerance), next inspection due October 2021

650.313 Inspection Procedures

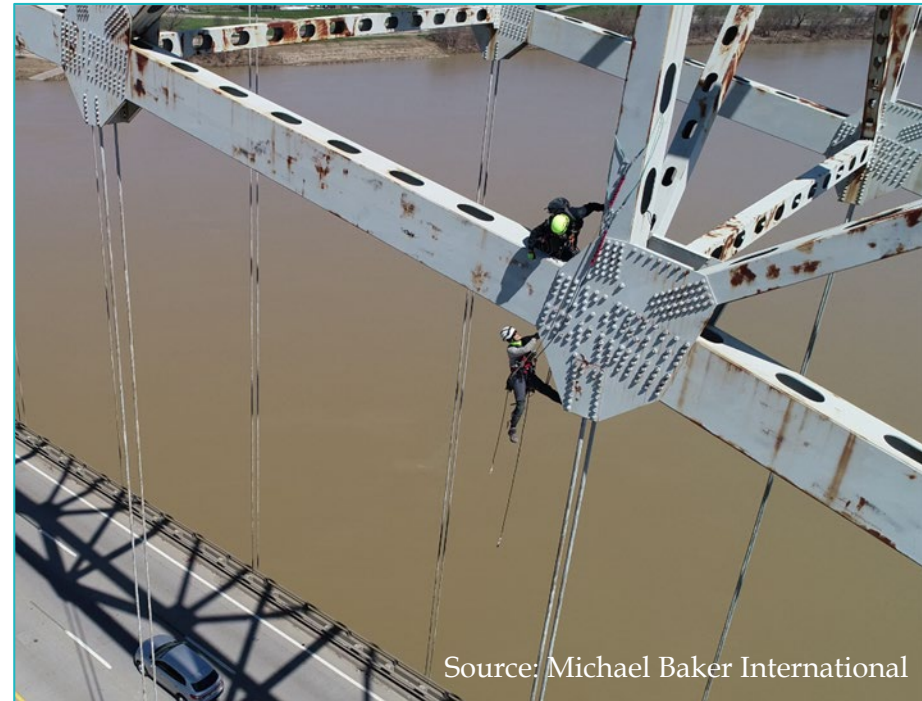
- 650.313(a) General
 - Section 4 of AASHTO Manual for Bridge Evaluation referenced
 - “..determine condition, identify deficiencies, and document results in an inspection report...”
 - Documented inspection plan, including appropriate equipment
 - Must “see” all
 - Advanced technologies like unmanned aerial systems and underwater sonar technologies to be added to the Bridge Inspector’s Reference Manual

650.313 Inspection Procedures

- 650.313(b) and (c) Initial and Routine Inspections
 - Initial inspection due after construction is completed and prior to bridge being open to traffic
 - Bridges in phased construction and temporary bridges
 - Develop and implement inspection procedures

650.313 Inspection Procedures

- 650.313(e) and (f)
Underwater and NSTM
Inspections
 - Underwater and NSTM
inspection are due within 6
months of opening for new,
replaced, and rehabilitated
bridges
 - NSTM inspections must be
hands-on inspections



Source: Michael Baker International

650.313 Inspection Procedures

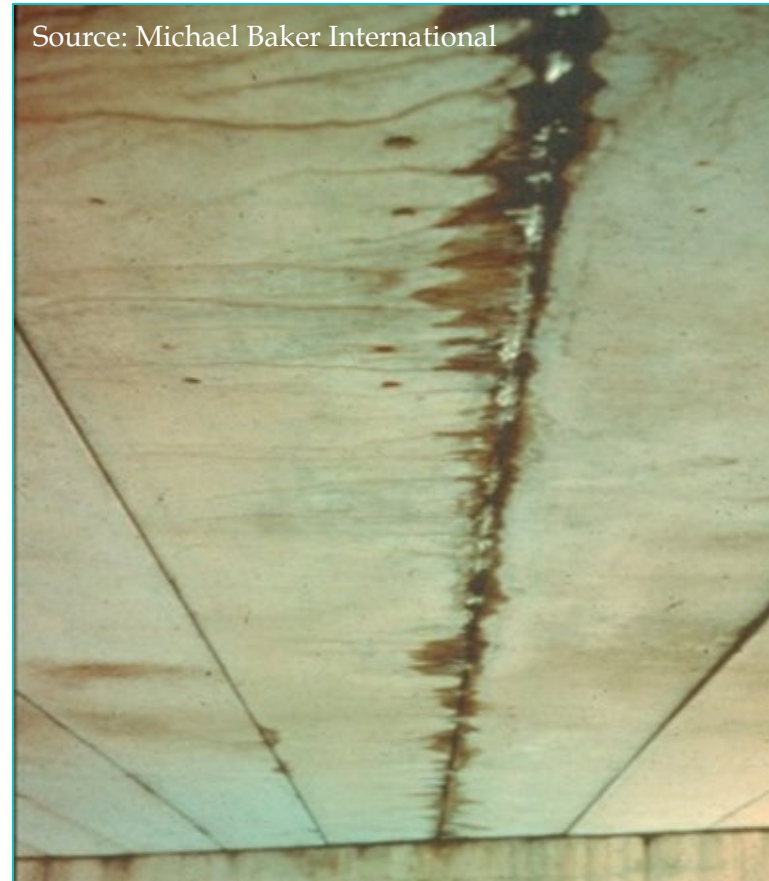
- 650.313(i), (j), (k) Load Rating, Load Posting, Closed Bridges
 - Load rate within 3 months of initial inspection and when changes warrant re-rating
 - Load rate for routine and special permit loads
 - Load post within 30 days of valid load rating or awareness of need
 - Develop and document criteria for when a bridge is to be closed



Source: Michael Baker International

650.313 Inspection Procedures

- 650.313(n) Quality Control and Quality Assurance
 - Section 4.1 of AASHTO Manual for Bridge Evaluation referenced
 - QA reviews done by someone else
 - Document results and address findings



650.313 Inspection Procedures

- 650.313(o) Critical Findings
 - Document procedures to address critical findings in a timely manner
 - Define critical findings considering the magnitude, location and consequence of a deficiency, where a finding causes in part:
 - Full or partial closure
 - Nonredundant member in condition state 4
 - Condition rating of 3 or lower
 - Certain critical findings must be reported within 24 hours
 - Full or partial closure
 - NHS bridge with nonredundant member in condition state 4
 - Monthly status reports

650.315 Inventory

- Data reported in accordance with *Specifications for the National Bridge Inventory*
- Data must be updated within three months of field portion of inspection is completed
- Establish and document a process that ensures the timeframes are met



650.317 Reference Manuals

- Incorporated by reference
 - AASHTO Manual for Bridge Evaluation, Second Edition
 - Sections 1.4, 2.1, 4, and 6 only
 - With 2011-2016 interims
 - AASHTO Manual for Bridge Element Inspection, First Edition
 - With 2015 interims
 - Specifications for the National Bridge Inventory
 - Specification for the National Bridge Inventory Bridge Elements

Specifications for the National Bridge Inventory



U.S. Department
of Transportation
**Federal Highway
Administration**

DRAFT

Specifications for the National Bridge Inventory



Source: Oregon DOT
Office of Bridges and Structures

Draft Final 06/27/2017



U.S. Department of Transportation
Federal Highway Administration

Development Criteria

- Highway bridge safety
- NBIS oversight
- Consistency with NBIS
- Reporting to Congress
- Emergency response
- Risk-based, data driven, performance management program
- Utilize data from existing management systems
- Clarity and ease of use

Development History

- October 2006 version: More than 2,000 comments
- Long pause ...
- Additional stakeholder outreach
- FHWA independent QC review
- AASHTO T-18 review: More than 500 comments
- Reviewed and updated to align with the NBIS NPRM

Global Changes

- U.S. customary units
- Consistency with Specifications for the National Tunnel Inventory & Highway Performance Monitoring System (HPMS)
- Specification & Commentary format
- Examples for every item
- Comprehensive example
- JSON data submittal format
- New Item IDs – Item grouping
 - Sections and sub-sections

Global Changes

- New items
- Discontinued items
- New & expanded item coding options
- No more “under” records
- One-to-one and many-to-one data sets
 - Can be more than one entry if needed, for example:
 - Inspections, Work Events, Posting dates;
 - Routes and other features on, under, over bridges;

Global Changes

- New & Expanded coding options
 - Grouped items will allow easier future modifications
 - Expanded coding options where needed
 - Ex. – Timber superstructure: solid sawn, glulam, nail-lam, stress-lam
 - Culvert designation –
 - Currently much coding inconsistency
 - Instead code superstructure type choices include pipe and concrete frame
 - Choices include buried or not, if conveys water or not

Global Changes

- “Under” records for non-NBIS structures no longer required
 - Bridge record will include ‘under’ clearance data directly
 - “Under” data for other structures over roadways no longer required

Many-to-one data sets

- Can be multiple entries if needed, for example:
 - Inspections, Work Events, Posting dates
 - Routes and other features on, under, over bridges
 - Deck, superstructure types or materials
 - If some spans differ from others
 - Inspections and other events where multiple can occur
- Will be able to capture all history and features within one bridge record

Document Format

SPECIFICATION FORMAT

These specifications provide information in a format modeled in part after the AASHTO design specifications, with the specification separated and presented parallel to the commentary. The format used to present the data items is as shown in the following table.

<i>Data Item Name</i>	
<u>Format</u>	<u>Frequency</u>
<u>Item ID</u>	
Specification	Commentary
Specification including any specific codes and information required.	Commentary on the specifications. Expanded guidance for the specification, but not intended to be a requirement of the specification.
Specification Continued, Commentary Continued, or Examples	
Additional space for Specification or Commentary, if needed. Examples are presented to further clarify the specification. Each item will typically have brief examples. A more comprehensive example will be found at the end of each section or subsection.	

Data Changes

- Latitude & Longitude in decimal degrees
- Linear Referencing System (LRS) data fields match HPMS
- Bridge Condition Classification
- Railing crash test level and condition
- Scour vulnerability and condition
- No sufficiency rating, structurally deficient classification, functionally obsolete classification, nor complicated appraisal items

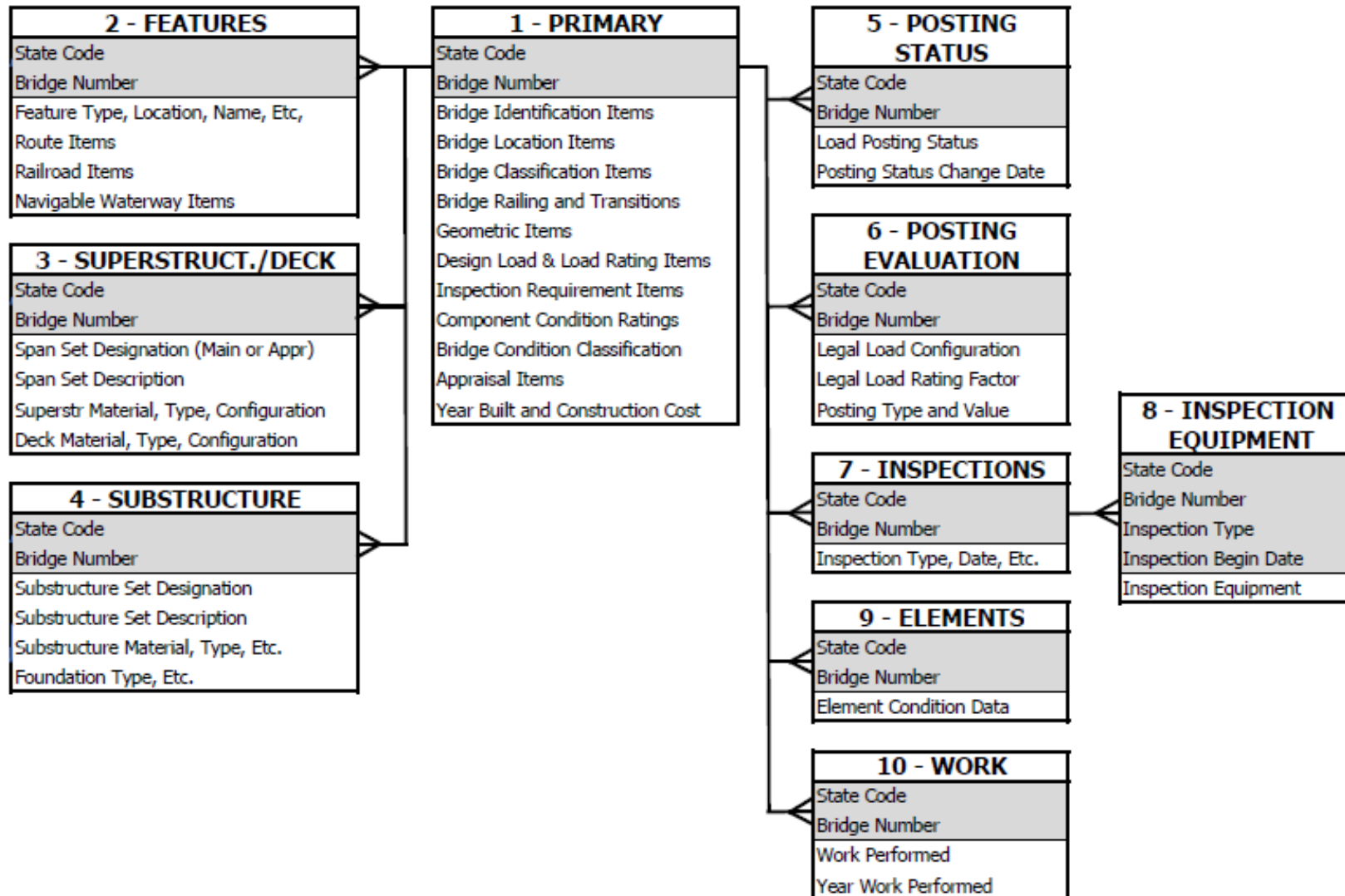
Data Changes

- Items discontinued from 1995 Coding Guide (24 items)
 - FHWA Region Code (1B)
 - Base Highway Network (12)
 - LRS Subroute Number (13B)
 - Structure Flared (35)
 - Approach Guardrail (36C)
 - Approach Guardrail Ends (36D)
 - Reference Feature (54A)*
 - Reference Feature (55A)*
 - Culvert Condition Rating (62)*
 - Structural Evaluation (67)
 - Deck Geometry (68)
 - Underclearances, Vt. & Hz. (69)
 - Work Done By (75B)
 - Length of Structure Improvement (76)
 - Bridge Improvement Cost (94)
 - Roadway Improvement Cost (95)
 - Total Project Cost (96)
 - Year of Improvement Cost Estimate (97)
 - Parallel Structure Designation (101)
 - Temporary Structure Designation (103)
 - Future Average Daily Traffic (114)
 - Year of Future Average Daily Traffic (115)
 - Sufficiency Rating Asterisk
 - Sufficiency Rating

Data Relationships

- Relational database proposed
 - Enhances database organization and speed
- Multiple data sets (data tables)
 - One row of data items to one bridge relationships
 - Example - Primary Data Set
 - Many rows of data items to one bridge relationships
 - Example - Inspections Data Set
- Group related data items from sections or sub-sections

Proposed Data Structure (condensed)



Regulation Repeal

- Highway Bridge Replacement and Rehabilitation Program
 - 23 CFR 650, Subpart D
- Discretionary Bridge Candidate Rating Factor
 - 23 CFR 650, Subpart G



What's Next?

- Federal Register notice
- Review comments
- Develop Final Rule
- Publish
- Transition Period



Federal Register Notice – How to comment

- NPRM and SNBI
- Website with documents
 - <https://www.regulations.gov/docket?D=FHWA-2017-0047>
 - <https://www.fhwa.dot.gov/bridge/inspection/update.cfm>
- Who to contact
 - Comments to the docket
 - Administrative questions to NBISrulemaking@dot.gov
- All comments will be considered
 - **Comment period closes January 13, 2020**



U.S. Department of Transportation
Federal Highway Administration
Office of Infrastructure

Thank you!

