CHAPTER ELEVEN
LOAD RATING

11.1 GENERAL INFORMATION

Consider the information in this chapter subject to change.

11.1.1 Purpose
Bridge load-ratings provide several useful results:
- Confirm a bridge has adequate design for normal operations capacity
- Identify those bridges that do not have adequate capacity for normal operations and consider such bridges for posting
- Provide bridge capacity information and models for routing overload permit vehicles
- Identify unused capacity in existing bridges
- Support examination of Structurally Deficient bridges
- Provide a review on new bridge design

11.1.2 Records Required for Rating
The engineer in charge of a specific bridge load rating is responsible for insuring that available documents are adequate to rate the bridge in the current condition and design. The minimum records required are:
- Bridge drawings of superstructure elements
  - Original and significant rehabilitations
- Bridge Inspection Reports

Some circumstances require a special-emphasis site inspection to complete the load rating. The most notable circumstances are bridges classified by routine bridge inspections to be “Structurally Deficient.”

11.1.3 Deliverables
A typical bridge load rating provides two deliverables: 1) A Virtis bridge model for NMDOT’s bridge model database and 2) a completed “NMDOT Bridge Load Rating Form.” Load ratings for a “Structurally Deficient” bridge also require explanation of
how the structural deficiency affects the bridge load capacity.

11.3 RATING METHODS

*The Manual for Bridge Evaluation* includes three rating methods: Load and Resistance Factored Rating (LRFR, based on Load and Resistance Factored Design, LRFD), Load Factored Rating (LFR, based on Load Factored Design), and Allowable Stress Rating (ASR, based on Allowable Stress Design). NMDOT uses BRASS as the primary underlying engine for Virtis bridge model analysis.

Use ASR for timber bridges and decks. Use LFR for all prestress concrete, reinforced concrete (including slab bridges), and steel bridges.

NMDOT plans to move to LRFR ratings. However, NMDOT has found problems with Virtis, BRASS, or with LRFR itself. Therefore, NMDOT is not yet routinely using LRFR ratings.

Members of substructures need not be routinely checked for load capacity. Substructure elements such as pier caps and columns should be checked in situations where the engineer has reason to believe that their capacity may govern the load capacity of the entire bridge. Examples of distress that could trigger a substructure load-rating include: a high degree of corrosion and section loss, caps cracked and distorted under torsion with inadequate sheer stirrups, changes in column end conditions due to deterioration, changes in column unbraced length due to scour, or columns with impact damage. Such cases will generally render a bridge “Structurally Deficient” and require a special-emphasis inspection.

When a bridge exhibits load capacity rating less than LFR HS20/HS33 Inventory/Operating (see Section 11.5 for HS20 definition) or LRFR $R_e < 1.0$, the bridge should be re-examined for rating improvement opportunities. These opportunities routinely include:

- Review the assumptions and model simplifications that affect bridge rating.
- Bridge drawings may include allowance for future wearing surface, but the bridge might have no wearing surface. If the bridge has no wearing surface or a lighter wearing surface, a rater may reflect this in the bridge model. In no case should the bridge
model contain a wearing surface that is less than the actual existing wearing surface.  

- Prestress concrete bridge designs before or shortly after 1979 used a different shear code standard. Virtis currently has no way to alter its shear analysis to recognize the pre-1979 code. If the controlling failure mode in a prestress concrete girder is shear, use the shear policy outlined under Section 11.4.5 “Prestress Concrete” to modify the rating.

Non-routine methods to improve load-rating results include:

- Virtis has deck finite element modeling capability. In a few rare cases, it is possible that using a finite element determined distribution factor will be more accurate and allow rating improvements.
- Use refined Methods of Analysis described in AASHTO LRFD Bridge Design Specifications Article 4.4.
- In extraordinary cases, consider “Nondestructive Load Testing” as described in Section 8 of The Manual for Bridge Evaluation or of the Manual for Condition Evaluation

Insure that deviations used to achieve sufficient load capacity are documented in “Notes, additional loads, comments or deviation from general rating practice” in the Bridge Load Rating Form. See Section 11.6.

### 11.4.1 Materials\Concrete

This section covers specific entries in the Virtis file tree, Materials\Concrete. The reader can launch Virtis and open the specific file folders “Material” and “Concrete.” Many other sections that follow also cover specific entries as identified in **bold**.

**Density.** Typically, use 0.150 kcf density for dead loads and 0.145 kcf for modulus of elasticity.

**Copy from Library.** Many older NM bridge drawings will call for “Class A Concrete.” This is not the same concrete as found in the Virtis Standard Library called “Class A” or “Class A (US).” NMDOT Class A Concrete is 3,000 psi while that listed in the Virtis Standard library is 4,000 psi concrete. The Virtis Standard library has no concrete matching NMDOT Class A. Virtis Standard Library Class A matches NMDOT Class AA. NMDOT Agency library files are available from the Bridge Bureau, and they include all NMDOT concrete classes.

### 11.4.2 Impact/Dynamic Load Allowance and Factors.

For general ratings without deviations from standard practice, make no changes to “Impact/Dynamic Load Allowance” or “Factors” in Virtis.

### 11.4.3 Superstructure Definitions

**New Superstructure Definition.** Generally, when selecting “New Superstructure Definition” in Virtis, select “Girder System Superstructure.” However, circumstances may prevent using a “Girder System.” For example, the most common circumstance requiring selecting a “Girder Line Superstructure” over a “Girder System” is modeling a slab bridge. Virtis has no method to model a complete slab bridge. Instead, it is modeled as a 12-inch strip analysis in a Girder Line. See Section 11.4.6.

**Structure Typical Section\Parapet or Railing.** Notice that typical bridge barrier rails in New Mexico are placed 18-inches from the bridge edge, but are not a full 18-inches wide. Therefore, modeling a bridge barrier rail as 0 from the bridge edge to the back of the rail is technically not accurate. A better approach is to model the barrier rail (parapet) as: “Measure To” **Front**; “Distance” 1.50 feet.
Structure Typical Section\Wearing Surface. NMDOT current policy is to design for a 30 psf future wearing surface. Previous design policy included a 15 psf wearing surface. If a bridge does not currently have a wearing surface, *The Manual for Bridge Evaluation* and the *Manual for Condition Evaluation* allow rating without the design future wearing surface included. One should always rate the bridge with the actual wearing surface if it is equal to, or greater than, the designed wearing surface. However, if a bridge has a wearing surface less than design wearing surface, first rate the bridge with the assumed design surface (typically 30 psf or 15 psf). If the bridge rates at least an HS20 Inventory and HS33 Operating, retain the model with the future wearing surface included. If the bridge rates less than HS20/33, then remove or reduce the wearing surface in the model to match actual bridge condition. Model and rate the bridge with this reduced wearing surface.

11.4.4 Member Alternatives
New Member Alternative Description\Girder property input method. When provided a choice between “Schedule based” and “Cross-section based” in “Member Alternative Description,” always select “Schedule based.” “Cross-section based” does not provide the same valuable schematics.

New Member Alternative Description\Crack Control Parameter (Z) and Exposure factor. Use Z = 170 kip/in for the concrete crack control parameter. Use Exposure factor = 1.0.

New Member Alternative Description\Default rating method. Each “Member Alternative” in Virtis has an input for “Default rating method.” Timber can only be rated using ASD. Virtis defaults to ASD on timber girders and decks. For all other “Member Alternatives” set the “Default rating method” to LRFR so that each model is set to rating bridges with LRFR when “Rating Method” selected is “Member Alternative.” This sets the Virtis bridge database for compliance with future LRFR ratings.

Deck Profile\Structural Thickness. Past NMDOT policy provided a ¼” sacrificial thickness in concrete decks. This is no longer NMDOT policy. A rating for older bridges with drawings that specify this sacrificial surface may, instead, include the full deck thickness without section reduction for sacrificial surface. Typically enter the full deck thickness for “Structural Thickness.”

11.4.5 Prestress Concrete
Note that prestress concrete bridges that are simple spans for both dead and live load but have jointless decks are not uncommon—both in bridge conversions to jointless decks and in new bridges. (See Section 5.6.2 “Eliminating Deck Joints” in this NMDOT *Bridge Procedures and Design Guide*). Caution: it is easy to misinterpret such bridges as being continuous for live loads. If it is possible that a continuous deck bridge is not continuous for live load, check details for breaks in continuity over the piers. One should model such jointless-deck simple-span bridge girders as simple span, not continuous.

Many prestress concrete bridges designed before or shortly after 1979 have served normal operations and overload permit loads well. These same bridges may theoretically fail in shear when analyzed with current shear design models. Virtis does not have an option to use the pre-1979 code, therefore use the procedure shown in Figure 11.4A.

Beam Shapes\Prestress Beam Shapes\I beams. Prestress I-beam strand patterns in Virtis default to vertical distances from bottom on 2-inch spacing. NMDOT typically
specifies strand patterns placed as 2-inch spacing from the bottom, but also as 2-inch spacing from the top for draped stands. The result is that strand patterns in New Mexico may not match the Virtis defaults for AASHTO beams with an odd number of inches for overall height. These are the Type 45 (AASHTO III), Type 63 (AASHTO V), and Type BT-63. Modify strand patterns as needed in these beams to match NMDOT prestress beam strand patterns accurately.

**Prestress Properties.** LRFR ratings require inputs that are not required by LFR. Since NMDOT will convert to LRFR rating, these inputs must be included in all Virtis models. Under “Superstructure Definitions” and “Prestress Properties,” they are:

- Transfer time, use 15.0 hours
- Age at deck placement, use 270 days
- Final age, use 3650 days

**Deck Profile\Reinforcement.** Prestress concrete bridge superstructures have steel reinforcing bars in the deck. However, the composite decks in simple spans are always modeled in compression for longitudinal capacity. Therefore, the deck rebar for simple spans (simple for dead and for live loads) is immaterial for load rating capacity and can be ignored. In contrast, the deck rebar is critical in prestress continuous bridges (simple for dead but continuous for live load).
11.4.6 Concrete Slab

Superstructure Definitions. Unlike most bridges, a concrete slab bridge cannot be Virtis-modeled as a “Girder System.” Instead, one must rate a concrete slab bridge using a “Girder Line.” Virtis “Girder Line” modeling does not allow Virtis to calculate several bridge aspects. Instead, the user must calculate these by hand. Calculated values available in a “Girder System” but not available for a “Girder Line” include:

- Live load distribution factors
- Dead load distribution
  - Wearing surface
  - Bridge barrier rail (parapet, railing)
  - Medians and curbs
  - Utilities

Member Location. Users may rate concrete slab bridges using only “Interior” for “Member Location.” This assumes that the original designer correctly designed the exterior (or edge) of the slab bridge. Alternatively, it recognizes that, although not modeled in design, a bridge barrier rail provides edge stiffness. Modeling only an interior equivalent slab assumes that the interior controls the slab bridge rating.

Live Load Distribution. The Live Load Distribution Factors for LFR using a 1-ft equivalent interior strip are:

Moment—

\[
DF = \frac{1 \cdot \text{ft}}{4 \cdot \text{ft} + 0.06 \cdot S} \geq \frac{1}{7}
\]

Deflection—

\[
DF = \frac{1}{6}
\]

For LRFR ratings, use the following distribution factors for moment, shear, and deflection:

One-lane loaded—

\[
DF = \frac{12 \cdot \text{in}}{10 \cdot \text{in} + 5 \cdot \frac{\text{in}}{\text{ft}} \cdot \sqrt{L \cdot W_1}}
\]

Two or more lanes loaded—

\[
DF = \frac{12 \cdot \text{in}}{84 \cdot \text{in} + 1.44 \cdot \frac{\text{in}}{\text{ft}} \cdot \sqrt{L \cdot W_2}} \geq \frac{1 \cdot \text{ft} \cdot N_L}{W}
\]

- \(DF\) = Live Load Distribution Factor
- \(N_L\) = Number of design lanes
- Not applicable if \(w < 20\) ft (only one lane loaded)
- \(2\) if \(20\) ft \(\leq w < 24\) ft
- Integer part of \((w/12)\) otherwise
- \(L\) = Modified span length; the lesser of \(S\) or 60 ft
- \(S\) = Longitudinal Span length
- \(W\) = Edge-to-edge bridge width
- \(W_1\) = Modified edge-to-edge width, one-lane loaded; lesser of \(W\) or 30 ft
- \(W_2\) = Modified edge-to-edge width, two or more lanes loaded; lesser of \(W\) or 60 ft
- \(w\) = Clear roadway width between curbs or barriers

Girder Profile\Section. Use a 12-inch Girder Line Equivalent Slab strip to model slab bridges. This is the selected NMDOT policy width calculation for equivalent slab width. Using a different width complicates model comparisons for quality control.

11.4.7 Steel

Deck Profile\Reinforcement. BRASS LFR load rating does not consider minimum negative flexure concrete deck reinforcement. However, BRASS LRFR rating does. LRFD 6.10.1.7 covers “Minimum Negative Flexure Concrete Deck Reinforcement.” If the deck reinforcing steel is not included in a continuous steel bridge model, Virtis/BRASS LRFR will fail the bridge under Service II over the piers. Therefore, all Virtis continuous steel bridges must include the deck reinforcement in the model for future use in LRFR rating.
**Lateral Support.** A steel girder with a concrete deck poured in direct contact develops an affinity for concrete. Therefore, a continuous hardened concrete deck provides continuous lateral support to the top flange of a girder. Note that the lateral support applied in the “Lateral Support” window applies only to the top flange. Virtis picks up the discrete locations of lateral support on the bottom flange from the “Framing Plan Detail, Diaphragms.”

11.4.8 **Timber**
Use Allowable Stress Rating (ASR) for timber girders and timber decks. Timber decks often control the rating in more primitively designed bridges found in New Mexico’s inventory. Timber decks must be routinely evaluated for a bridge load rating.

**Materials\Timber.** _Girder unknown species and grade._ In selecting timber materials, Virtis has a “Copy from Library” option. For completely unknown species and grade, but reasonably typical New Mexico timber bridge, choose Douglas Fir-Larch, No. 1 for Beams and Stringers or for Posts and Timbers. If the rater knows that the girders in a particular bridge are free of notable weathering and without checks or splits, the rater may choose Douglas Fir-Larch, Dense No.1.

“Beams and Stringers” are rectangular timber members whose nominal dimensions are greater than 5” in both directions, but one dimension is more than 2” greater than the other is. E.g., 9”x14”; 8”x12”.

“Posts and Timbers” are rectangular timber members whose nominal dimensions are greater than 5” in both directions and the dimensions are the same or no more than 2” difference. E.g., 12”x12”; 8”x10”.

**Southern Yellow Pine Dense.** In some old timber bridge drawings, the species and grade specified for the bridge is Southern Yellow Pine Dense Longleaf and Shortleaf. This is a dated specification. If a timber bridge uses this specification for girders, select “Southern Pine (Dry or Wet), Dense Select Structural, 5”x5” & larger.” For the deck, the drawings will call for Southern Yellow Pine Dense. However, unless otherwise known, assume the deck has been replaced. Since the replacement deck species is probably unknown, see below.

**Deck unknown species and grade.** Decks will typically be lumber. Lumber reads as “2”– 4” thick 2” and wider,” or similar description in the Virtis/Opis library. Choose Hem-Fir No.2 unless more is known from records or reports.

**Timber Beam Shapes\Rectangular\ Properties.** The “Compute” button will fill in all areas except “Nominal load,” “Nominal width,” and “Nominal depth.” Use 50 lb/cf and actual dimensions to calculate “Nominal load.” “Nominal width” or “Nominal depth” is the next highest whole number for the actual dimension. 9.25” → 10”

**Superstructure Definitions.** A rater should be sure to select “Deck type” as “timber” the first time “Girder System Superstructure Definitions” comes up in the bridge model inputs. Failure to note the correct “Deck type” will require restarting the “Superstructure Definition.” Virtis does not allow returning and correcting the “Deck type” after initial entry.

**Deck.** The “Deck LL distribution width” is 15-inches plus the “Total deck thickness.”

**Deck\Factors.** Always exercise the Deck\Factors input page. For all three moisture conditions, leave the default, “Wet,” selected. Use the “Compute” button to supply
the various modification factors for the deck timber. Unless one is familiar with judging “Shear factor” by visual inspection or if the rater has not had an opportunity to inspect the deck lumber, enter 1.0 for the “Shear factor.”

**Structure Typical Section\Wearing Surface.** Many timber bridges have excessive asphalt wearing surfaces. A timber bridge’s load rating is sensitive to this dead load. The rater must examine the bridge documents, or examine the bridge itself, to ascertain an estimate of the existing overlay thickness.

**Beam Details\Adjustment Factors.** As with the Deck Factors, always exercise the Beam Details\Adjustment Factors input page. Moisture conditions should all remain “Wet.” The “Compute” button will supply all factors except the “Shear factor.” Enter 1.0 for “Shear factor” unless otherwise familiar with a girder visual inspection and what to look for to allow an improved “Shear factor.”

**11.4.9 Library Explorer**
NMDOT Bridge Bureau maintains an “Agency File” for addition to the Virtis Library. This Agency File contains materials, vehicles, and appurtenances encountered repeatedly in New Mexico. Consultants should insure they have the latest NMDOT Agency Files when appropriate.

**11.5 RATING VEHICLES**
Figure 11.5A through 11.5F illustrate rating vehicles used in New Mexico.

**11.5.1 NMDOT Rating Truck**
Figure 11.5A shows a modified HS20 Truck. The modification from the standard AASHTO HS20 is that the rear axle is fixed at 14-feet rather than varying from 14 to 30-feet. This modified HS20 Truck is the basis for NMDOT’s Permit Load bridge evaluation software, OVLOAD, and its “Method of Equivalent Loading.” NMDOT requires this fixed-rear-axle truck be the basis for Inventory and Operationing rating. One should note that the fixed axle yields slightly better ratings in some bridge geometries than would the unmodified HS20. Use this modified HS20 Truck. This truck is available in NMDOT’s Virtis Agency File, titled “HS20 Rating Truck.” A \( R_f = 1 \) using this NMDOT Rating Truck results in a bridge capacity rating of HS20.

NMDOT is aware that the HS20 Rating Truck without the variable axle from 14-ft to 30 ft does not conform to national standards. The use of this HS20 Rating (Fixed 14-ft axles) in New Mexico dates back to 1982 when New Mexico State University first authored OVLOAD. Subsequently this became NMDOT’s standard practice. New Mexico does report load ratings to the Federal National Bridge Inventory (NBI) using this fixed-axle truck. However, NMDOT will ignore this minor non-conformity and, instead, concentrate load-rating policy changes on bringing future NMDOT Bridge rating into conformance with LRFR rating approach—both for NBI reporting and for OVLOAD input.

**Figure 11.5A**
NMDOT HS20 Modified Truck for Rating
11.5.2 HL-93

AASHTO LRFD Bridge Design Specifications defines the “Design Vehicular Live Load” known as HL-93 in Article 3.6.1.2. HL-93 will become integral to NMDOT’s bridge load rating when NMDOT transitions to LRFR.

11.5.3 Legal Loads

New Mexico uses a family of nine trucks as legal load model trucks. Three of these trucks are AASHTO Legal Loads. Six are trucks derived from New Mexico Law to capture a range of likely load-effects from trucks meeting the legislative definition for legal trucks in New Mexico. Figure 11.5B illustrates the two-axle legal load truck. Figure 11.5C illustrates the three trucks with different axle spacing and weights intended to capture three-axle truck effects. Likewise, 11.5D shows a four-axle, and 11.5E shows three-five-axle trucks. Figure 11.5F illustrates the AASHTO six-axle vehicle.

11.5.4 Bridge Posting Analysis

NMDOT uses legal load trucks from Section 11.5.3 to establish bridge load posting. Bridges with an Operating Rating less than HS17 (Rating Factor < 0.85 for HS 20 Rating Truck) require rating the bridge with this family of nine trucks.

Engineering load rating is only one factor of many in the basis for decisions related to...
bridge posting. Posting is a policy decision made by the bridge owner. In New Mexico, the bridge owner is one of the NMDOT Districts. Posting is not a purely engineering activity. Other issues involved in a District’s decision regarding bridge posting are:

- Bridge structure redundancy
- Bridge condition or visible distress
- Character of traffic
- Likelihood of overweight vehicles
- History of abuse
- Posting enforceability

For the engineering side of posting, as a bridge’s capacity becomes further below standard design standards, there is increased uncertainty in the specific effects and in public compliance with load postings.

This increased uncertainty calls for an increased safety factor. Use the following equation from *The Manual for Bridge Evaluation* to produce such increased safety factor:

\[
\text{Safe Posting Load} = \frac{W}{0.7} \cdot (RF - 0.3)
\]

RF = Legal load rating factor

W = Weight of rating vehicle

For each axle class, two-axle through five-axle, the resulting lowest “Safe Posting Load” becomes the engineering posting load analysis for that bridge and axle number—with the exception that in no case will fewer axle

Figure 11.5D

**NM Legal 4-Axle**

Figure 11.5E

**NM Legal 5-Axle**

Figure 11.5F

**NM Legal 6-Axle**
posted load be greater. For example, a three-axle posting cannot be greater than a four-axle posting.

11.6 BRIDGE LOAD RATING FORM
A current version of the bridge load rating form is available from the State Bridge Rating Engineer. Figure 11.6 shows an example NMDOT Bridge Rating Form. This is the version current at time of this writing; however, form details may be subject to change. Bridge Inspection Reports contain the information needed for the “Bridge Information” section. These Bridge Inspection Reports also provide the information for “Structure Conditions” under the “Rating Approach Summary.”

Notes, additional loads, comments or deviation from general rating practice: This section under “Rating Approach Summary” should never be ignored. Many bridges require some commentary not covered in other “Rating Approach Summary” items. The standard items and this “Notes …” section should provide enough detail so that another engineer, using the same drawings and same tools, would be readily able to replicate the rating.

11.7 QUALITY ASSURANCE
Virtis software demands are high. It always requires accuracy and detail. Sometimes it requires elevated engineering judgment. To improve the assurance NMDOT receives a quality product, NMDOT requires a Quality Control process.

NMDOT’s Quality Control process has two engineers create independent Virtis Models. The senior of the two engineers, or a third engineer, uses both models to rate the bridge girders and compares the outcome. Significant differences require reviewing the two models, identifying where they differ, and making changes to models to correct the mismatch. The process continues until both bridges rate within 2% for each girder in both bridge girder systems.

Consultants may adopt NMDOT’s Quality Control process or they may propose one of their own. NMDOT’s State Bridge Engineer or State Bridge Load Rating Engineer must approve a proposed consultant Quality Control process that differs from the NMDOT Quality Control approach.

NMDOT will also sample consultant’s ratings to check results quality. NMDOT will report any errors, even minor ones, back to the consultant. A pattern of errors will lead to a request for discussion regarding rating procedures that might address and correct inaccurate modeling.

NMDOT’s quality review will not be comprehensive and will not reliably catch all errors. NMDOT reviews are samplings and spot checks only. Consultant Quality Assurance remains primarily the consultant’s responsibility.
### Figure 11.6

**NMDOT Bridge Rating Form**

New Mexico Department of Transportation

**BRIDGE RATING FORM**

<table>
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<tr>
<th>Today's date: October 0, 2008</th>
<th>Name of Person Completing Form: Frank Form</th>
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#### BRIDGE INFORMATION

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<th>Structure Number: 07734</th>
<th>Facility/Route Carried: NM-89</th>
<th>Feature Intersected: Rabbit Gulch</th>
<th>Location MP/miles from intersection: MP 5.1/4 m W of J-2, NM-2</th>
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<table>
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<tr>
<th>District: Four</th>
<th>Location Latitude/Longitude: 36.1334° N - 106.34° W</th>
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#### RATING APPROACH SUMMARY

Rating Method: ☑ LFR ☑ ASR ☑ LFIR
LFR rating using HS-20 required on all bridges. LFIR (HL-93) required for all new bridges.

Live Loads Checked: ☑ HS20 ☑ HL-93 ☑ Legal Loads
Other—Identify: ☑

#### Criteria Used in Rating:

- Current Wear Surface: ☑ No ☑ Yes
- Future Wear Surface: ☑ No ☑ Yes
- Magnitude (lb/ft): [ ]
- Super (5%) = [ ]
- Sub (5%) = [ ]

SIP Forms: ☑ No ☑ Yes
Magnitude (lb/ft): [ ]
Concr Sacrificial Wear: ☑ No ☑ Yes
Thk(n): [ ]

Utilities: ☑ No ☑ Yes
Magnitude/Description: [ ]

Structure Conditions:
- Deck (5%) = 5
- Super (5%) = 6
- Sub (5%) = 6

#### Notes:

Additional loads, comments or deviation from general rating practice: Original design allowed for 15 psf future wearing surface. However, bridge rates low and has no current wearing surface; therefore, allowance for future wearing surface was included in rating.

#### QUALITY CONTROL METHODS USED:

- T authors/BRASS

Quality Control Method if any: Describe. Two engineers (Ed lead and Jingles) modeled the bridge independently. Then the senior engineer (Lead) compared and converted the bridge models to rates within 2% of each other.

#### RATING

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<td>NM 3-Axle Rf = 0.657</td>
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<td>Rating &lt; HS17</td>
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| LFR RL-93 RATING | Inventory Rf = 0.255 Operating Rf = 0.388 | Optional |

#### PRINT NAME

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#### RATING ORGANIZATION

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#### NMDOT ACEPTED

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#### NMDOT Bridge Management Unit

#### PLANS AND FILES

Electronic File Used to Model and Rate Bridge Available at: [ ]
OR Paper Documentation for Bridge Rating Available at: [ ]

OR Date:

Plans Available at, or delivered to: [ ]
Structure Number: 07734

December 2008

NMDOT BRIDGE PROCEDURES
AND DESIGN GUIDE

11-12