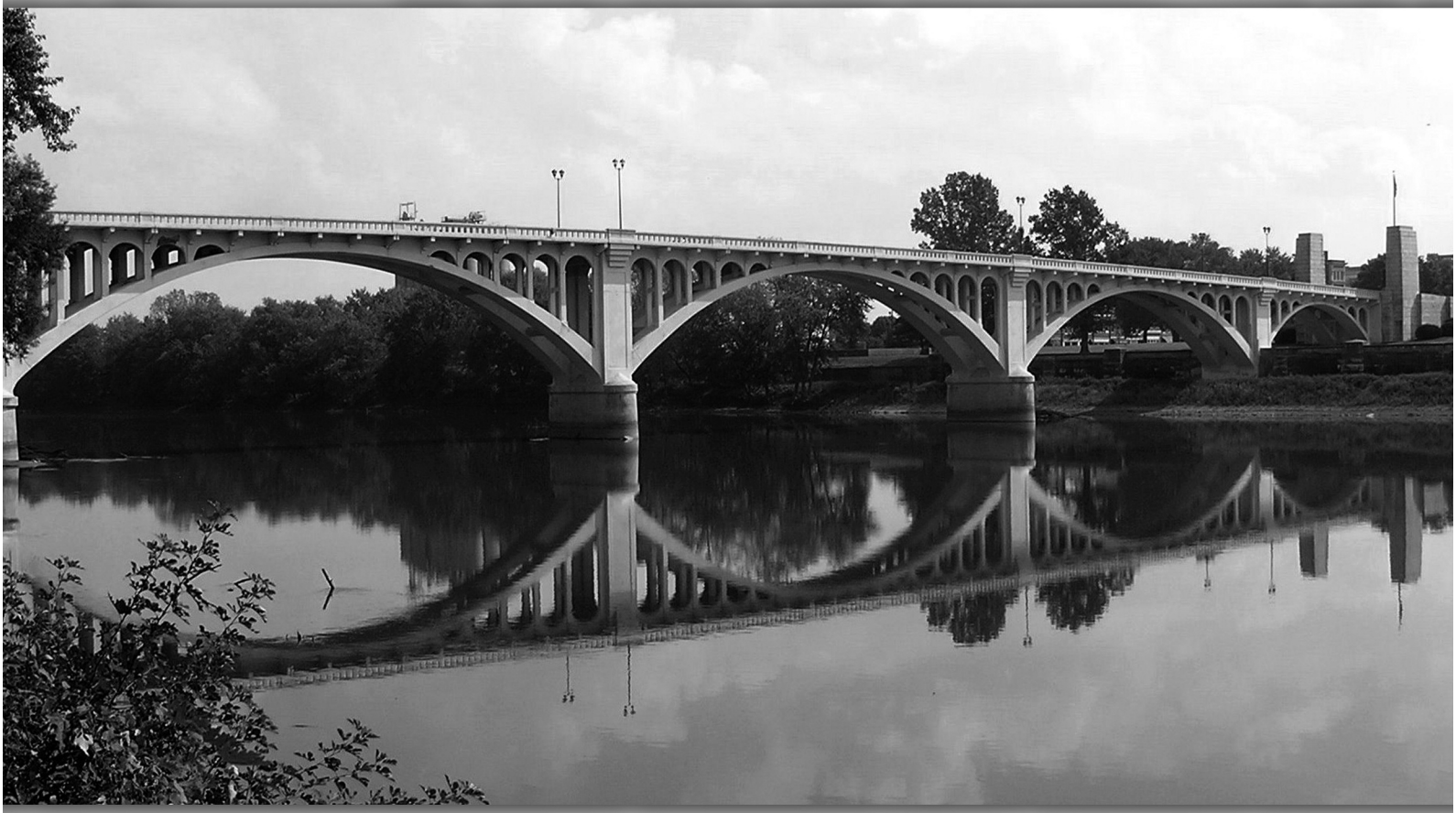
State of Illinois
Illinois Department of Transportation



Bridge Element Inspection Manual

Illinois Department of Transportation

0526-14, 02/14

Bridge Element Inspection Manual

Prepared by Bureau of Bridges and Structures
Division of Highways

Published by Illinois Department of Transportation

Springfield, Illinois

February 7, 2014
Continually Updated Resource

Document Control and Revision History

The Illinois Manual for Bridge Element Inspection is owned by the Illinois Department of Transportation Bureau of Bridges and Structures. The guide is reviewed during use and updated by the Bureau of Bridges and Structures, as necessary.

All changes in the main body of the manual are identified with a revision date at the top of the element description page.

Interim changes are communicated through the Bureau of Bridges and Structures email subscription services. Copies are available electronically on the IDOT web site.

Archived versions of this guide are available to examine in the Policy and Research Center, Room 320 of the Hanley Building.

Electronic
Portable Document Format (PDF) has been selected as the primary distribution format, and the official version of the guide is available on the Policy & Research Center Library site on InsideIDOT.

Hard Copy
This manual is not distributed in hard copy format. Users of this manual who choose to print a copy of the guide are responsible for ensuring use of the most current version.

Revision History

Revision Date	Description	Approval
March 14, 2014	Revised page 19 “P/S Concrete Elements” to “Precast and Precast Prestressed Concrete Elements”. Element 8209, “MSE Abutment and Wingwall (SF)” was added. Element was added to Alphabetical Index and Numerical Index. Revised page 7 “Concrete Deck/Slab Cathodic Protection”. In Condition State 4, revised “…above condition state 3 or 4…” to “…above condition state 2 or 3…”. Revised page 46, “Concrete Bridge Railing”, aligned “handrail” in Condition State 3. Revised page 51 “Environment Descriptions”, in Item B deleted “and face girders” and added “and” between “diaphragms” and “bearings”. Revised “Table of Contents” for changes in page numbers. In Appendix, revised reference to “CS3” to “CS2” in crack details. In Appenix, added Total Quantity for Primary Cable (LF)	Steve Beran

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CONCRETE DECK/SLAB BARE

11/12/2013

These elements include: Unprotected bare concrete, which receives direct traffic loads. Precast and precast prestressed beams top surfaces are included in element 8034. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8038. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
12	Concrete Deck Bare (**SF**)
8034	Precast Concrete Deck Bare (**SF**)
8038	Concrete Slab Bare (**SF**)
8056	**Precast Concrete Deck w/Rigid 5" Overlay (SF)**

Condition State 1 The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add a protective system and wearing surface

Condition State 2 Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add a protective system and wearing surface

Condition State 3 Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

Condition State 4 Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting crack or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

CONCRETE DECK/SLAB UNPROTECTED W/HMA OVERLAY

11/12/2013

These elements include: HMA overlaid and bituminous sealed concrete decks/slabs without a waterproof membrane system, which receive direct traffic loads. Precast and precast prestressed beams top surfaces are included in element 8035. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8039. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8013	Concrete Deck Unprotected w/ HMA Overlay (**SF**)
8035	Precast Concrete Deck Unprotected w/ HMA Overlay (**SF**)
8039	Concrete Slab Unprotected w/ HMA Overlay (**SF**)

Condition State 1 The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Cold patch repairs are not considered sound repairs. Square cut hot mix and concrete repairs are sound repairs.

Feasible actions:
1) DN
2) *Wash

Condition State 2 Potholes, map cracked areas, parallel cracks at 2' centers or less, intersecting cracks, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Patch holes, seal or inject cracks
3) *Remove overlay, add protection system and wearing surface

Condition State 3 Large potholes, large ruts or washboards, in the deck surface or spalls/delaminations exposing reinforcement in the concrete deck or soffit exist.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace Deck

Condition State 4 Large potholes, large ruts, washboard, repairs, spalled/delaminated, map cracked or intersecting longitudinal and transverse cracked areas in the deck surface and/or subsurface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

CONCRETE DECK/SLAB PROTECTED W/ HMA OVERLAY

11/12/2013

These elements include: HMA overlaid concrete decks/slabs with a waterproof membrane system, which receive direct traffic loads. Precast and precast prestressed beams top surfaces are included in element 8036. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8040. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8014	Concrete Deck Protected w/ HMA Overlay (**SF**)
8036	Precast Concrete Deck Protected w/HMA Overlay (**SF***)*
8040	Concrete Slab Protected w/ HMA Overlay (**SF**)

Condition State 1 The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Cold patch repairs are not considered sound repairs. Square cut hot mix and concrete repairs are sound repairs.

Feasible actions:
1) DN
2) *Wash

Condition State 2 Potholes, map cracked areas, intersecting cracks, parallel cracks at 2' centers or less, stalactitic leaching cracks or surface spalls/delamination without reinforcement corrosion exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Patch holes, seal or inject cracks
3) *Remove overlay, add protection system and wearing surface

Condition State 3 Large potholes, large ruts or washboards, in the deck surface or spalls/delaminations exposing reinforcement in the concrete deck or soffit exist.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

Condition State 4 Large potholes, large ruts, washboard, repairs, spalled/delaminated, map cracked or intersecting longitudinal and transverse cracked areas in the deck surface and/or subsurface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

CONCRETE DECK/SLAB PROTECTED W/ THIN (<1") OVERLAY

09/30/2013

These elements include: Concrete decks/slabs that have a less than 1 inch thick cementitious overlay which receive direct traffic loads. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8044. All other decks protected with thin overlays, including precast beams, are included in element 8018. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8018	Concrete Deck Protected w/ Thin Overlay (**SF**)
8044	Concrete Slab Protected w/ Thin Overlay (**SF**)

Condition State 1 The deck surface and soffit have no deficiencies. There are no spalled/delaminated, map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add overlay

Condition State 2 Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, or stalactitic leaching cracks, spalls/delaminations are not associated with corroding reinforcement exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add overlay

Condition State 3 Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

Condition State 4 Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Conditions state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

CONCRETE DECK/SLAB PROTECTED W/ RIGID (>1") OVERLAY

09/30/2013

These elements include: Concrete decks/slabs that have a rigid overlay 1 inch thick or greater which receive direct traffic loads. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8048. All other decks protected with overlays, including precast beams, are included in element 8022. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8022	Concrete Deck Protected w/ Rigid Overlay (**SF**)
8048	Concrete Slab Protected w/ Rigid Overlay (**SF**)

Condition State 1 The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash

Condition State 2 Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement, or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks

Condition State 3 Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

Condition State 4 Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

CONCRETE DECK/SLAB COATED BARS

09/30/2013

These elements include: Bare concrete decks/slabs that are protected with epoxy coated bars, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8026	Concrete Deck Protected w/ Coated Bars (**SF**)
8033	Concrete Deck Protected w/ Coated Bars w/ PPC Panels (**SF**)
8052	Concrete Slab Protected w/ Coated Bars (**SF**)

Condition State 1 The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add concrete overlay

Condition State 2 Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, stalactitic leaching cracks or surface spalls/delaminations without reinforcement corrosion exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add concrete overlay

Condition State 3 Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

Condition State 4 Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

CONCRETE DECK/SLAB CATHODIC PROTECTION

Revised 03/14/2014

These elements include: Concrete decks/slabs that are protected with cathodic protection which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8027	Concrete Deck Protected w/Cathodic Protection (**SF**)
8053	Concrete Slab Protected w/Cathodic Protection (**SF**)

Condition State 1 The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, or spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) Replace anode

Condition State 2 Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) Repair cathodic protection

Condition State 3 Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Repair cathodic protection
3) *Replace deck

Condition State 4 Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) *Replace cathodic protection
3) *Replace deck

OPEN GRID DECK

11/12/2013

This element includes: Steel open grid decks, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
28	Steel Deck Open Grid (**SF**)

Condition State 1 The deck has no deficiencies. There is no corrosion. The paint system is sound. All connections are sound.

Feasible actions:
1) DN
2) *Wash

Condition State 2 The paint system has failed, and corrosion has formed or secondary connectors show cracked welds or broken rivets or bolts.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

Condition State 3 Measurable corrosion or connections have failed on secondary grid or primary connections show cracks.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

Condition State 4 Measurable corrosion or connections to the floor system have failed on the primary grid.

Feasible actions:
1) DN
2) Spot blast, clean and paint or reconnect
3) *Replace deck

FILLED GRID DECK

11/12/2013

This element includes: Steel grid decks filled with concrete, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
29	Steel Deck Concrete Filled Grid (**SF**)

Condition State 1 The deck has no deficiencies. There is no corrosion. The paint system is sound. The deck has no delaminations. Connections are sound.

Feasible actions:
1) DN
2) *Wash

Condition State 2 The paint system has failed and corrosion has formed or secondary connectors show cracked welds or broken rivets or bolts. If present, wearing surface has map cracked areas, intersecting longitudinal and transverse cracks.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

Condition State 3 Grid fill is spalling, secondary grid connections have failed or have measurable corrosion, or primary connections show cracks.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

Condition State 4 Grid fill has large spalls, measurable corrosion or connections to the floor system have failed on the primary grid.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

FILLED GRID DECK w/HMA OVERLAY

11/12/2013

This element includes: Steel grid decks filled with concrete, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8057	**Steel Deck Concrete Filled Grid w/HMA Overlay (SF)**

Condition State 1 The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated, or map cracked areas in the deck surface. The protection system of the deck soffit is sound. Previously repaired/repainted areas may exist in the deck surface or soffit. There is no corrosion. The paint system is sound. Connections are sound.

Feasible actions:
1) DN
2) *Wash

Condition State 2 Potholes, map cracked areas, parallel cracks at 2' centers or less, or intersecting cracks exist in the deck surface or the underside protection system is being affected. The paint system has failed and corrosion has formed or secondary connectors show cracked welds or broken rivets or bolts.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

Condition State 3 Large potholes, large ruts or washboard areas in the deck surface or the soffit is corroding. Secondary grid connections have failed or have measurable corrosion, or primary connections show cracks.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

Condition State 4 The surfacing has failed, grid fill has large spalls, measurable corrosion or connections to the floor system have failed on the primary grid.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

CORRUGATED/ORTHOTROPIC DECK

08/19/2013

This element includes: Steel decks, which support traffic loads. Included are the tops of steel box superstructures and asphalt filled corrugated decks. Orthotropic deck paint condition and corrosion should be reported with the superstructure element. This element does not include: Stay in place corrugated steel forms used to temporarily support concrete decks during placement. Steel stay in place forms should be evaluated as the soffit of the concrete deck element.

Elem #	Description
30	Corrugated/Orthotropic/Etc. Deck (**SF**)

Condition State 1 The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated, or map cracked areas in the deck surface. The protection system of the deck soffit is sound. Previously repaired/repainted areas may exist in the deck surface or soffit.

Feasible actions:
1) DN
2) *Wash

Condition State 2 Potholes, map cracked areas, parallel cracks at 2' centers or less, or intersecting cracks exist in the deck surface or the underside protection system is being affected.

Feasible actions:
1) DN
2) Patch holes, seal cracks
3) *Remove overlay, add protection system and wearing surface

Condition State 3 Large potholes, large ruts or washboard areas in the deck surface or the soffit is corroding but no measurable section loss.

Feasible actions:
1) DN
2) Patch holes and seal cracks
3) *Remove overlay, add protection system and wearing surface

Condition State 4 Corrosion is advanced. Measurable section loss warrants analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. The surfacing has failed.

Feasible actions:
1) DN
2) *Rehabilitate, replace paint system, replace surfacing
3) *Replace deck

TIMBER DECK/SLAB BARE

10/18/1995

These elements include: Bare timber decks/slabs, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
31	Timber Deck Bare (**SF**)
54	Timber Slab Bare (**SF**)

Condition State 1 The deck has no deficiencies. There may be small cracks, splits and checks having no effect on strength or serviceability. There is no decay, wet areas, and insect infestation.

Feasible actions:
1) DN
2) *Clean
3) *Clean and seal

Condition State 2 Decay, insect infestation, splitting, cracking or crushing may exist but none is sufficiently advanced to affect serviceability or strength. The deck may be covered with debris or rocks but no serious wearing. Fire damage limited to surface scorching with no measurable section loss. Areas, which collect and hold water intermittently are included.

Feasible actions:
1) DN
2) *Clean
3) *Clean and seal

Condition State 3 Decay, insect infestation, splitting cracking or crushing has produced loss of strength of the element but not of sufficient magnitude to affect the serviceability of the bridge. Debris or rocks may have caused minor section loss. Fire damage limited to surface charring with minor, measurable section loss. Wet areas with sufficient water present to support fungus growth.

Feasible actions:
1) DN
2) *Clean and seal
3) Replace deficient members

Condition State 4 Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that affects the serviceability of the bridge. Debris or rock may have caused greater than 1/2" deep ruts or wear. Major fire damage which substantially reduces the load-carrying capacity of the deck. Wet areas with possibly green leafy growth growing from the deck.

Feasible actions:
1) DN
2) Replace deficient members
3) *Replace deck

TIMBER DECK/SLAB OVERLAY

11/12/2013

These elements include: Overlaid timber decks/slabs, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

Elem #	Description
8032	Timber Deck with HMA Overlay (**SF**)
8055	Timber Slab with HMA Overlay (**SF**)

Condition State 1 Investigation indicates no decay. There may be cracks, splits and checks having no effect on strength or serviceability. There are no potholes in the surfacing.

Feasible actions:
1) DN
2) *Clean

Condition State 2 Decay, insect infestation, splitting, cracking or crushing may exist but none is sufficiently advanced to affect serviceability. Potholes, map cracked areas, intersecting cracks exist in the deck surface. Fire damage limited to surface scorching without measurable section loss. Areas, which collect and hold water intermittently are included.

Feasible actions:
1) DN
2) *Clean
3) *Remove/replace overlay

Condition State 3 Decay, insect infestation, splitting cracking or crushing has produced loss of strength of the element but not of sufficient magnitude to affect the serviceability of the bridge. Large potholes, large ruts or washboards in the deck surface. Fire damage limited to surface charring with minor, measurable section loss. Wet areas with sufficient water present to support fungus growth.

Feasible actions:
1) DN
2) *Rehabilitate deck and repair or replace surfacing
3) *Replace deck and surfacing

Condition State 4 Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that affects the serviceability of the bridge. Large potholes, large ruts, washboards, map cracked areas are positioned above areas of the soffit which show advanced section loss. Major fire damage which substantially reduces the load-carrying capacity of the deck. Wet areas with green leafy growth growing from the deck.

Feasible actions:
1) DN
2) *Rehabilitate deck and repair or replace surfacing
3) *Replace deck and surfacing

SIDEWALK

11/12/2013

These elements include: Optional element for sidewalks which are not expected to receive direct traffic loads.

Elem #	Description
8058	**Sidewalk (SF)**

Condition State 1 The sidewalk surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the sidewalk surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the sidewalk soffit. Sound previously repaired areas may exist in the sidewalk surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add a protective coating system

Condition State 2 Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the sidewalk surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add a protective coating system

Condition State 3 Spalls/delaminations exposing reinforcement exist in the sidewalk surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair / Curb Face Concrete Repair
3) *Replace sidewalk

Condition State 4 Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the sidewalk surface are positioned directly above spalls/delaminations, map cracked, intersecting crack or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the sidewalk surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the sidewalk, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace sidewalk

PROTECTION SYSTEM
UNPAINTED STEEL ELEMENTS

11/12/2013

These elements include: The protection system of unpainted ASTM 588 or ASHTTO M222 steel substructure and superstructure elements that were designed to achieve corrosion protection by a uniform collection of corrosion products on the steel surface. Other Steel chemistries that were installed unpainted or have lost their original paint system will be included with Protection System Non-Lead Painted Steel Elements (p. 17).

Elem #	Description
8101	Unpainted Steel Closed Web/Box Girder (**SF**)
8106	Unpainted Steel Open Girder (**SF**)
8112	Unpainted Steel Stringer (**SF**)
120	Unpainted Steel Bottom Chord Through Truss (**SF**)
8125	Unpainted Steel Through Truss Excluding Bottom Chord (**SF**)
8130	Unpainted Steel Deck Truss (**SF**)
8140	Unpainted Steel Arch/Arch Tie (**SF**)
8151	Unpainted Steel Floor Beam (**SF**)
8160	Unpainted Steel Pin and/or Hanger (**EA**)
8171	Unpainted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**)
8180	Unpainted Steel Deck Truss Below Deck Joints (**SF**)
8190	Unpainted Steel Floor Beam Below Deck Joints (**SF**)
8201	**Unpainted Steel Column (SF)**
8222	Unpainted Steel Abutment and Wingwall (**SF**)
8224	**Unpainted Steel Pile Extension (SF)**
8230	Unpainted Steel Pier or Abutment Cap (**SF**)
8270	Unpainted Steel Pier or Abutment Cap Below Deck Joint (**SF**)

Condition State 1 The weathering steel is corroded uniformly and remains in excellent condition. Surfaces covered by mill scale are included.

Feasible actions:
1) DN
2) *Wash

Condition State 2 Surface pitting has formed or is forming on the unpainted steel.

Feasible actions:
1) DN
2) *Wash
3) *Clean and paint

Condition State 3 Steel has measurable section loss due to corrosion up to 1/16” per face.

Feasible actions:
1) DN
2) *Wash
3) *Clean and paint, minor repair

Condition State 4 Corrosion is advanced. Section loss is greater than 1/16” per face.

Feasible actions:
1) DN
2)*Rehabilitate entire unit
3)*Replace entire unit

PROTECTION SYSTEM
LEAD PAINTED STEEL ELEMENTS

11/12/2013

These elements include: The protection system of lead painted steel substructure and superstructure elements. Lead paint use was discontinued in 1988; therefore any bridge built in 1989 or later should not have a lead paint system. Structures built prior to 1989 that were over-coated with non-lead paint are included because the lead paint system was not removed.

Elem #	Description
102	Lead Painted Steel Closed Web/Box Girder (**SF**)
107	Lead Painted Steel Open Girder (**SF**)
113	Lead Painted Steel Stringer (**SF**)
8121	Lead Painted Steel Bottom Chord Through Truss (**SF**)
8126	Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**)
8131	Lead Painted Steel Deck Truss (**SF**)
141	Lead Painted Steel Arch/Arch Tie (**SF**)
152	Lead Painted Steel Floor Beam (**SF**)
161	Lead Painted Steel Pin and/or Hanger (**EA**)
162	**Lead Painted Steel Gusset Plate (EA)**
8172	Lead Painted Steel Closed Web/Box Girder and Open Girder /Stringer Ends Incl Diaphragms Below Deck Joints (**EA**)
8181	Lead Painted Steel Deck Truss Below Deck Joints (**SF**)
8191	Lead Painted Steel Floor Beam Below Deck Joints (**SF**)
202	**Lead Painted Steel Column** (**SF**)
8221	Lead Painted Steel Abutment and Wingwall (**SF**)
225	**Lead Painted Steel Pile Extension (SF)**
231	Lead Painted Steel Pier or Abutment Cap (**SF**)
8271	Lead Painted Steel Pier or Abut Cap Below Deck Joints (**SF**)

Condition State 1 There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface. The top coat may be discolored and\or chalking.

Feasible actions:
1) DN
2) *Wash

Condition State 2 This condition state includes a wide range of visible paint conditions. It includes conditions from little active corrosion through surface or freckled rust to complete paint system failure. The paint system is no longer effective. There may be exposed metal with very slight rust scaling but little pitting or metal losses have occurred.

Feasible actions:
1) DN
2) *Wash
3) * Zone clean and paint entire surface

Condition State 3 The paint system has failed and measurable section loss has occurred. Metal loss is less than or equal to 1/16” per face.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace paint system

Condition State 4 Corrosion has caused section loss and substantial metal loss is evident (greater than 1/16" per face) and some perforation may have occurred.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace entire unit

PROTECTION SYSTEM
NON-LEAD PAINTED STEEL ELEMENTS

11/12/2013

These elements include: The protection system of non-lead painted steel substructure and superstructure elements Includes elements protected with galvanizing / metalizing.

Elem #	Description
8103	Non-Lead Painted Steel Closed Web/Box Girder (**SF**)
8118	Non-Lead Painted Steel Open Girder (**SF**)
8119	Non-Lead Painted Steel Stringer (**SF**)
8122	Non-Lead Painted Steel Bottom Chord Through Truss (**SF**)
8123	Non-Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**)
8124	Non-Lead Painted Steel Deck Truss (**SF**)
8128	Non-Lead Painted Steel Arch/Arch Tie (**SF**)
8129	Non-Lead Painted Steel Floor Beam (**SF**)
8162	Non-Lead Painted Steel Pin and/or Hanger (**EA**)
8163	**Non-Lead Painted Steel Gusset Plate (EA)**
8173	Non-Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Incl Diaphragms Bel Deck Joints (**EA**)
8182	Non-Lead Painted Steel Deck Truss Below Deck Joints (**SF**)
8192	Non-Lead Painted Steel Floor Beam Below Deck Joints (**SF**)
8200	**Non-Lead Painted Steel Column (SF)**
8220	Non-Lead Painted Steel Abutment and Wingwall (**SF**)
8236	Non-Lead Painted Steel Pier or Abutment Cap (**SF**)
8246	**Non-Lead Painted Steel Pile Extension (SF)**
8272	Non-Lead Painted Stl Pier or Abut Cap Bel Deck Joints (**SF**)

Condition State 1 There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface. The top coat may be discolored and\or chalking.

Feasible actions:
1) DN
2) *Wash

Condition State 2 This condition state covers a wide range of visible paint conditions. It includes conditions from little active corrosion through surface or freckled rust to complete paint system failure. Exposed metal may have very slight rust scaling but no pitting or measurable section loss occurred.

Feasible actions:
1) DN
2) *Wash
3) Zone clean and paint entire surface

Condition State 3 The paint system has failed and measurable corrosion has occurred. Section loss is less than or equal to 1/16” per face.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace paint system

Condition State 4 Corrosion has caused section loss and substantial metal loss is evident (greater than 1/16" per face) and some perforation may have occurred.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace entire unit

STEEL DAMAGED ELEMENTS

11/12/2013

These elements include: Damage caused to steel substructure and superstructure elements not associated with active corrosion; which are identified and added as necessary by the inspector in the field during the inspection.

Elem#	Description
8401	Steel Closed Web/Box Girder (**LF**)
8402	Steel Bottom Chord Through Truss (**LF**)
8403	Steel Through Truss Excluding Bottom Chord (**LF**)
8404	Steel Deck Truss (**LF**)
8406	Steel Open Girder (**LF**)
8407	Steel Arch/Arch Tie **(LF**)
8408	Steel Floor Beam (**LF**)
8409	**Steel Column (LF)**
8410	Steel Pier or Abutment Cap (**LF**)
8411	Steel Pin and/or Hanger (**EA**)
8412	Steel Stringer (**LF**)
8413	**Steel Gusset Plate (EA)**
8414	**Steel Pile Extension (LF)**

Condition State 1 Suspected locations where minor fatigue, out-of-plane bending cracks, tears or perforation could develop in structural elements that should be monitored during future inspections.

Feasible actions: 1) DN

Condition State 2 Minor fatigue, out-of-plane bending cracks, tears, or perforation may be present in structural elements. Minor impact damage may have occurred. Excessive live load deflection occurs. Minor pitting has been cleaned and painted that does not require immediate action.

Feasible actions:
1) DN
2) Grind cracks or plate, lubricate hinges
3) Straighten or install new section

Condition State 3 Moderate fatigue, out-of-plane bending cracks, tears, or perforation in structural elements parallel to the direction of stress. Hinges may be frozen from corrosion. Impact damage has occurred and\or permanent deformations may be evident. Section loss up to 1/16” per face has been cleaned and painted.

Feasible actions:
1) DN
2) Grind cracks or plate; lubricate hinges
3) Straighten or install new section

Condition State 4 Severe fatigue, out-of-plane bending cracks, impact damage, tears or perforations have occurred that requires repairs. Hinges demonstrate uneven alignment horizontally from below or vertically from the deck above. Temporary supports may have been installed following structural analysis to allow continued utilization of the structure. Section loss greater than 1/16” per face has been cleaned and painted.

Feasible action:
1) DN
2) Install new sections
3) *Replace entire unit

PRECAST AND PRECAST PRESTRESSED CONCRETE ELEMENTS

Revised 03/14/14

These elements include: Precast and precast prestressed substructure and superstructure elements.

Elem #	Description
104	P/S Concrete Closed Web/Box Girder (**LF**)
109	P/S Concrete Open Girder (**LF**)
8142	P/S Concrete Segmental Box Girders (**LF**)
143	P/S Concrete Arch/Arch Tie (**LF**)
154	P/S Concrete Floor Beam (**LF**)
204	**P/S Concrete Column (SF)**
8209	**MSE Abutment and Wingwall (SF)**
226	**P/S Concrete Pile Extension (SF)**
233	P/S Concrete Pier or Abutment Cap (**LF**)
8237	P/S Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**)

Condition State 1 The element shows no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without affect on strength and/or serviceability. No rust stains visible.

Feasible actions: 1) DN

Condition State 2 Minor cracks & spalls may be present and there may be exposed reinforcing with no evidence of corrosion. There is no exposure of the prestress system. Minor rust stains visible.

Feasible actions: 1) DN
2) Seal cracks and minor patch

Condition State 3 Delaminations and/or spalls may be present. There may be minor exposure but no deterioration of the prestress system. Corrosion of non-prestressed main reinforcement may be present but loss of section is incidental. Minor impact damage may have occurred. Working flexural cracks and other miscellaneous cracks with medium rust staining.

Feasible actions: 1) DN
2) Clean steel and patch (and/or seal cracks)
3) *Rehabilitate unit

Condition State 4 Delaminations, spalls and corrosion of non-prestressed main reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, failed anchorages, etc). Damages due to vehicular collision that may have caused wires to be severed and/or large concrete section loss. Longitudinal joints may have failed. Rocking of members may be visible with the passage of live load. Temporary supports may have been installed following structural analysis to allow continual utilization of the structure.

Feasible actions: 1) DN
2) *Rehabilitate unit
3) *Replace unit

Note: For condition state 4, the quantity reported is to equal the entire beam length.

REINFORCED CONCRETE ELEMENTS

11/12/2013

These elements include: Reinforced concrete substructure and superstructure elements.

Elem #	Description
105	Concrete Closed Webs/Box Girder (**LF**)
110	Concrete Open Girder (**LF**)
144	Concrete Arch/Arch Tie (**LF**)
155	Concrete Floor Beam (**LF**)
205	**Concrete Column (SF)**
210	Concrete Pier Wall (**SF**)
215	Concrete Abutment and Wingwall (**SF**)
227	**Concrete Pile Extension (SF)**
234	Concrete Pier or Abutment Cap (**LF**)
8238	Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**)

Condition State 1 The element shows no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without affect on strength and/or serviceability. No rust stains visible.

Feasible actions: 1) DN

Condition State 2 Minor cracks & spalls may be present but there is no exposed main reinforcing or surface evidence of reinforcement corrosion. Minor rust stains visible.

Feasible actions: 1) DN
2) Seal cracks and minor patch

Condition State 3 Delaminations and/or spalls in the cover concrete may be present and main reinforcing may be exposed. Corrosion of main reinforcement may be present but loss of section is incidental. Working flexural cracks, map cracked areas or leaching cracks, and other miscellaneous cracks with medium rust staining. Minor impact damage may have occurred.

Feasible actions: 1) DN
2) Clean reinforcement and patch, (and/or seal cracks)
3) Rehabilitate unit

Condition State 4 Advanced deterioration. Measurable section loss of main reinforcement and/or loss of core concrete section. Internal failures have caused excessive movement. Damages due to vehicular collision that have caused reinforcement to be severed and/or large concrete section loss. Temporary supports may have been installed following structural analysis to allow continued utilization of the structure.

Feasible actions: 1) DN
2) Repair and seal unit
3) *Replace unit

Note: For condition state 4, the quantity reported is to equal the entire beam length.

KEYWAY

08/19/2013

This element includes: Grout in longitudinal joints between precast beams and the outside 2" of the precast beam above the keyway.

Elem #	Description
8108	Keyway (**LF**)

Condition State 1 This element shows no deterioration. There are no cracks in the joint grout or in the overlay above the longitudinal joints and no visible leakage between the beams.

Feasible actions: 1) DN

Condition State 2 There may be tight cracks in the joint grout or in the overlay, or visible leakage between the beams is evident.

Feasible actions:
1) DN
2) Seal cracks in the surface
3) Clean and seal keyway

Condition State 3 Portions of the keyway have failed indicated by long wide or working longitudinal cracks and small portions (less than 12" along the length of the beam) of the joint may be fractured loose, but the beams are still acting as a single unit. Considerable leakage between the joints is evident.

Feasible actions:
1) DN
2) Clean and epoxy grout keyway
3) Remove and replace *grout in effected* keyways *and bearings*

Condition State 4 The entire keyway has failed and the beams are acting independently indicated by wide or working longitudinal cracks the whole span length in the grout, wide or working cracks in the beam concrete above the keyway, large portions of the joint grout fractured loose or visible movement of the beam under live load. This condition requires that a load limit evaluation be conducted on the bridge.

Feasible actions:
1) DN
2) *Remove and replace *grout in* all keyways *and grout bearings*

TIMBER ELEMENTS

09/30/2013

These elements include: Timber substructure and superstructure elements. Timber closed abutments will normally include timber column or pile extension elements, as well as abutment (retaining timber elements).

Elem #	Description
111	Timber Open Girder (**LF**)
117	Timber Stringer (**LF**)
135	Timber Truss (**LF**)
146	**Timber Arch (LF)**
156	Timber Floor Beam (**LF**)
206	**Timber Column** (**EA**)
216	Timber Abutment and Wingwall (**SF**)
228	**Timber Pile Extension (EA)**
235	Timber Pier or Abutment Cap (**LF**)
8239	Timber Deck Runners (**LF**)

Condition State 1 Investigation indicates no decay. There may be superficial cracks, splits and checks having no affect on strength or serviceability. Preservative is in place and functioning or untreated timber is sheltered from moisture and not in contact with the earth.

Feasible actions: 1) DN

Condition State 2 Decay, insect infestation, splitting, cracking, checking or minor crushing may exist but none is sufficiently advanced to affect serviceability of the element. Preservative is in place but demonstrates thinning beyond surface discoloration. Minor leaking is occurring on untreated sheltered timbers. Fire damage limited to surface scorching with no measurable section loss.

Feasible actions:
1) DN
2) *Apply preservative

Condition State 3 Decay, insect infestation, splitting, cracking or crushing has produced loss of strength of the element but not of a sufficient magnitude to affect the serviceability of the bridge. Preservative is ineffective or nonexistent and timber is exposed to the weather or in contact with the earth. Fire damage limited to surface charring with minor, measurable section loss.

Feasible actions:
1) DN
2) *Apply preservative
3) Replace affected members

Condition State 4 Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that affects the serviceability of the bridge. Major fire damage which will substantially reduce the load carrying capacity of the member.

Feasible actions:
1) DN
2) Replace affected members
3) *Replace unit

CABLES

11/12/2013

This element includes: The cable, cable protection system, if present, and cable anchorage system. Primary Cables include main cables in suspension bridges or main cable stays in cable stayed bridges. Secondary Cables include suspender cables in suspension or arch bridges. Excluded are all cables used as temporary supports to the structure or replacement truss members. Two suspension cables will be counted per suspension bridge. Cable hangers will be counted as 1 (one) each per hanger location, regardless of the number of cables at the hanger location.

Elem #	Description
147	**Primary Cable (LF)**
148	**Secondary Cable (EA)**

Condition State 1 There is little or no corrosion of the steel. Paint system, if present, is sound and functioning as intended to protect the metal surface. Strand and anchor sockets show no signs of distress.

Feasible actions: 1) DN

Condition State 2 Surface rust efflorescence or other stains may have formed on the exterior protection system. Paint system, if present, is peeling and is no longer effective. Strand and anchor sockets show no signs of distress. *Cable banding or protective sheathing, if any, may show some loosening or slipping*.

Feasible actions:
1) DN
2) Clean and paint affected cable
3) Patch affected protective sheathing

Condition State 3 The paint system, if present, has failed. Surface pitting may be present but any section loss is incidental. Cable anchor devices may be loosening. One or two cable strands or wires may be broken or severely abraded.

Feasible actions:
1) DN
2) *Clean and paint
3) *Rehabilitate cable and replace paint system

Condition State 4 Corrosion is advanced with measurable section loss. More than two cable strands or wires may be broken or severely abraded. Anchors may show signs of slippage.

Feasible actions:
1) DN
2) *Rehabilitate unit and replace paint system
3) *Replace unit

"OTHER" SUBSTRUCTURE MATERIALS

11/12/2013

These elements include: Stone, masonry, etc. substructure elements.

Elem #	Description
211	Other Pier Wall (**SF**)
218	Other Abutment and Wingwall (**SF**)

Condition State 1 There is little or no deterioration. Only surface defects are in evidence.

Feasible actions: 1) DN

Condition State 2 There may be minor deterioration, cracking and weathering. Mortar in joints may show minor deterioration.

Feasible actions:
1) DN
2) Rehabilitate affected area
3) Minor repair, i.e. tuck point

Condition State 3 Moderate to major deterioration and cracking. Major deterioration of joints.

Feasible actions:
1) DN
2) Rehabilitate affected areas
3) Minor repair, i.e. tuck point

Condition State 4 Major deterioration, splitting, or cracking.

Feasible actions:
1) DN
2) Rehabilitate unit
3) *Replace unit

STEEL CULVERT

10/18/95

This element includes: Steel culverts having at least 5 feet barrel width and end sections, if present.

Elem #	Description
240	Steel Culvert (**LF**)

Condition State 1 The element shows little or no deterioration. Some discoloration or surface corrosion may exist but there is no metal pitting.

Feasible actions: 1) DN

Condition State 2 There may be minor to moderate corrosion with pitting, especially at the barrel invert. Little or no distortion exists.

Feasible actions: 1) DN

Condition State 3 Significant corrosion, deep pitting or some holes in the invert may exist. Significant scour or erosion may be affecting structural integrity. Minor to moderate distortion and deflection may exist. There is little or no roadway settlement.

Feasible actions:
1) DN
2) Rehabilitate affected lengths (i.e. line/pave invert)
3) *Replace unit

Condition State 4 Major corrosion, extreme pitting or holes in the barrel may exist. Major distortion, deflection or settlement may be evident.

Feasible actions:
1) DN
2) Rehabilitate affected lengths (i.e. line/pave invert)
3) *Replace unit

CONCRETE CULVERT

10/18/95

This element includes: Concrete culverts having at least 5 feet barrel width. When traffic loads are applied directly to the top slab, the slab condition will be reflected in the appropriate slab element.

Elem #	Description
241	Concrete Culvert (**LF**)

Condition State 1 Superficial cracks and spalls may be present, but there is no exposed reinforcing or evidence of rebar corrosion. There is little or no deterioration or separation of joints.

Feasible actions: 1) DN

Condition State 2 Deterioration, minor chloride contamination, minor cracking and/or leaching may have occurred. There may be deterioration and separation of joints. Rebars may be exposed with little or no section loss.

Feasible actions:
1) DN
2) Seal cracks, coat rebars, and minor patch

Condition State 3 There may be moderate to major deterioration, extensive cracking and/or leaching and large areas of spalls. Minor to moderate distortion, settlement, or misalignment may have occurred. There may be considerable deterioration and separation of joints.

Feasible actions:
1) DN
2) Seal cracks, coat rebars, and minor patch
3) Rehabilitate affected lengths and roadway

Condition State 4 Major deterioration, spalling, cracking, major distortion, deflection settlement, or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls.

Feasible actions:
1) DN
2) Rehabilitate affected lengths and roadway
3) *Replace unit and roadway

OTHER CULVERT

10/18/95

This element includes: Stone, masonry, etc. culverts including end sections/wingwalls.

Elem #	Description
243	Other Culvert (**LF**)

Condition State 1 There is little or no deterioration. Surface defects only are in evidence. There are no misalignment problems.

Feasible actions: 1) DN

Condition State 2 There may be minor deterioration, cracking and misalignment.

Feasible actions: 1) DN
2) Tuck point, patch and seal

Condition State 3 Moderate to major deterioration and cracking and/or minor to moderate distortion or deflection has occurred.

Feasible actions: 1) DN
2) Tuck point, patch and seal
3) Rehabilitate affected lengths

Condition State 4 Major distortion, deflection, settlement or misalignment and/or major deterioration affecting structural integrity may have occurred.

Feasible actions: 1) DN
2) Rehabilitate affected lengths
3) *Replace unit

STRIP SEAL JOINT

11/12/2013

This element includes: Longitudinal and transverse expansion joint devices which utilize a neoprene type waterproof gland with some type of steel extrusion or other system to anchor the gland.

Elem #	Description
300	Strip Seal Expansion Joint (**LF**)

Condition State 1 There is no leakage at any point along the joint. Gland is secure and has no defects.

Feasible actions: 1) DN

Condition State 2 Minor leakage may be occurring along the joint. Gland is secure and has minimal defects. Debris in joint is not causing any problems.

Feasible actions: 1) DN

Condition State 3 Leakage due to punctured or ripped joint, gland pulled out of extrusion or loss of bond between concrete and the extrusion. Minor corrosion or debris on elements below. Minor concrete spalling or loosening of extruded steel.

Feasible actions:
1) DN
2) Patch, reset, clean joint
3) *Replace gland, reset extruded steel and patch concrete

Condition State 4 Major deterioration of gland, concrete spalled at joint, major leakage along joint causing significant damage to elements below.

Feasible actions:
1) DN
2) *Replace gland, reset extruded steel and patch concrete
3) *Replace joint

POURABLE JOINT

11/12/2013

This element includes: Longitudinal and transverse *approved pourable joints including* the XJS Joint System.

Elem #	Description
301	Pourable Joint Seal (**LF**)

Condition State 1 There is no leakage at any point along the joint. Sealant is secure and has no defects.

Feasible actions: 1) DN

Condition State 2 The element shows minimal deterioration. Minor leakage may be occurring along the joint. There are no cohesion cracks. The adjacent deck armor and/or header is sound.

Feasible actions: 1) DN

Condition State 3 Minor adhesion and/or cohesion failures may be present. Leakage is occurring, and seal may show minor sagging, bulging, stretching and/or embedded with debris. Minor spalls and/or cracks in deck and/or headers may be present adjacent to joint. Minor corrosion or debris on elements below. Armor may be loose.

Feasible actions:
1) DN
2) Clean and repair seal, seal cracks, patch concrete and/or epoxy inject anchors

Condition State 4 Significant adhesion and/or cohesion failures are present. Seal may show excessive sagging, bulging, stretching and/or embedded with debris. Adjacent deck may be spalled and/or heavily cracked. Armor may be loose or anchors exposed or broken. Major leakage along joint causing significant damage to elements below.

Feasible actions:
1) DN
2) Clean and repair seal; patch spalls, seal cracks and/or epoxy inject anchors
3) *Reconstruct joint

PREFORMED JOINT

11/12/2013

This element includes: Longitudinal and transverse 1 3/4 inch through 4 inch preformed joint seals, armor angles, retainer bars and the concrete in the block out details. Jeene joints are included in this element.

Elem #	Description
302	Preformed Joint Seal (**LF**)

Condition State 1 There is no leakage at any point along the joint. PJS is secure and has no defects.

Feasible actions: 1) DN

Condition State 2 The element shows minimal deterioration. Minor leakage may be occurring along the joint. There are no cracks in the PJS. The adjacent deck armor and/or header is sound. The membrane is not over compressed.

Feasible actions: 1) DN

Condition State 3 There may be small contact failures. The PJS may be over compressed. There may be leakage extending to the bearing surface. Minor corrosion or debris on elements below. The seal may show signs of abrasion or tearing. Minor spalls in the deck and/or headers may be present. Armors may be loose. Retainer bars may be loose or missing but seal remains in place.

Feasible actions:
1) DN
2) Seal cracks, patch concrete, seal and/or epoxy inject anchors

Condition State 4 Wide contact failures may be present. The seal is possibly showing signs of failure from abrasion or tearing. The PJS may be excessively compressed forcing the rubber to protrude above the deck. There may be heavy leakage causing significant corrosion to elements below. Significant spalls may be present in the deck and/or headers adjacent to the seal. Armor anchorage may be exposed. Armors may be loose or missing.

Feasible actions:
1) DN
2) Seal cracks, patch concrete, reposition and seal and/or epoxy inject anchors
3) *Rebuild joint

MODULAR JOINT

10/18/95

This element includes: Deck joints filled with an assembly mechanism.

Elem #	Description
303	Modular Joints (**LF**)

Condition State 1 The element shows minimal deterioration. The anchors are tight. There are no broken welds. The adjacent deck is sound. The paint system, if present, is sound and functioning as intended to protect the metal.

Feasible actions: 1) DN

Condition State 2 The paint system, if originally applied is substantially functioning. The steel may show some corrosion with slight pitting and edge or localized plate rusting. There may be minor weld cracking. There may be minor cracking and/or spalling of the anchorage concrete. Minor leaking through the joint causing minimal damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks, inject epoxy

Condition State 3 The paint system, if originally applied, is failing. The steel is corroding with moderate pitting and minor section loss. There may be moderate weld cracking (greater that 10% of the welds cracked). One or two components may be loose or rattling. The adjacent deck may be cracked, spalled or otherwise disbonded. Anchors may be loose. There may be moderate leaking resulting in minor corrosion to elements below.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks, inject epoxy
3) Rehabilitate unit replacing damaged sections

Condition State 4 Corrosion is advanced. The assembly may be loose because of anchorage failure. There may be deck spalling adjacent to the assembly. Broken or missing components or broken welds may be prevalent. There may be heavy leaking causing significant corrosion to elements below.

Feasible actions:
1) DN
2) Rehabilitate unit replacing damaged sections
3) *Replace unit

OPEN JOINT

11/12/2013

This element includes: Longitudinal and transverse simple deck joints where no water seal is provided, with or without steel armor. Open joints filled with joint filler are also included in this element.

Elem #	Description
304	Open Expansion Joint (**LF**)

Condition State 1 The element shows no deterioration. Joint armor, if present, is secure. There are no joint spalls.

Feasible actions: 1) DN

Condition State 2 The element shows minimal deterioration. Joint armor, if present, is secure. There are no significant joint spalls.

Feasible actions:
1) DN
2) *Seal joint

Condition State 3 There may be deck cracking indicating armor anchor loosening. Spalling at joint edges or adjacent to armor may have begun. There may be corrosion on joint armor. Minor corrosion or debris on elements below.

Feasible actions:
1) DN
2) Minor repairs including: concrete patching, epoxy injection and/or seal cracks
3) *Seal joint

Condition State 4 Advanced corrosion of joint armor. There may be large spalls at the joint edges or adjacent to armor. Armor anchors are loose. Significant damage to elements below.

Feasible actions:
1) DN
2) Rehabilitate affected sections
3) *Reconstruct joint and seal

FINGER JOINT

11/01/96

This element includes: Those deck joints filled with an assembly mechanism designed to bridge the joint gap without protecting elements below.

Elem #	Description
305	Finger Joints without Trough (**LF**)

Condition State 1 The element shows minimal deterioration. The anchors are tight. There are no broken welds or fingers. The adjacent deck is sound. The paint system, if it is present, is sound and functioning as intended to protect the metal.

Feasible actions: 1) DN

Condition State 2 The steel may show some corrosion with slight pitting and edge or localized plate rusting. There may be minor weld or finger cracking. There may be minor cracking and/or spalling of the anchorage concrete.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks, inject epoxy and/or cut or weld fingers

Condition State 3 The paint system on the underside of the joint has failed. The steel is corroding with moderate pitting and minor section loss. There may be moderate weld or finger cracking (greater than 10% of the welds are cracked). Components may be loose or rattling. The adjacent deck may be cracked, spalled or otherwise disbonded. Fingers are raised toward opposing traffic. Anchors may be loose.

Feasible actions:
1) DN
2) Minor repair including spot paint, patch concrete, seal cracks, inject epoxy and/or cut or weld fingers
3) Rehabilitate unit by replacing damaged sections

Condition State 4 Corrosion is advanced. The assembly may be loose because of anchorage failure. There may be deck spalling adjacent to the assembly. Broken fingers may be present.

Feasible actions:
1) DN
2) Rehabilitate unit by replacing damaged sections
3) *Replace unit

TROUGH FINGER JOINT

09/30/2013

This element includes: Those deck joints filled with an assembly mechanism designed to bridge the gap and protect elements below.

Elem #	Description
8306	Finger Joints with Trough (**LF)**

Condition State 1 The element shows minimal deterioration. The anchors are tight. There are no broken welds or fingers. The adjacent deck is sound. The paint system, if present, is sound and functioning as intended to protect the metal. The trough is not leaking.

Feasible actions: 1) DN

Condition State 2 The steel may show some corrosion with slight pitting and edge or localized plate rusting. There may be minor weld or finger cracking. There may be minor cracking and/or spalling of the anchorage concrete. Minor leaking of the trough resulting in little or no damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks and/or trough, inject epoxy and/or cut or weld fingers

Condition State 3 The paint system on the underside of the joint has failed. The steel is corroding with moderate pitting and minor section loss. There may be moderate weld or finger cracking (greater than 10% of the welds are cracked). Components may be loose or rattling. Fingers are raised towards opposing traffic. There is moderate leaking resulting in damage to elements below. The adjacent deck may be cracked, spalled or otherwise disbonded. Anchors may be loose.

Feasible actions:
1) DN
2) Minor repair including spot paint, patch concrete, seal cracks and/or trough, inject epoxy and/or cut or weld fingers.
3) Rehabilitate unit by replacing damaged sections

Condition State 4 Corrosion is advanced. The assembly may be loose because of anchorage failure. There may be deck spalling adjacent to the assembly. Broken fingers may be prevalent. There may be heavy leaking causing significant damage to elements below.

Feasible actions:
1) DN
2) Rehabilitate unit by replacing damaged sections
3) *Replace joint

NEOPRENE JOINT

11/12/2013

This element includes: Longitudinal and transverse expansion joint devices, which utilize individual block segments to form a discontinuous seal. This joint type has not been used since 1984; therefore any structure built in 1985 or later should not contain this element.

Elem #	Description
8307	Neoprene Expansion Joint (**LF**)

Condition State 1 The element shows minimal deterioration. There is little or no leakage. The blocks are secure and have no defects. Debris in joint is not causing any problems. The adjacent deck is sound. The joint is properly seated and aligned.

Feasible actions: 1) DN

Condition State 2 The seal may be punctured or ripped but still anchored. Anchors may be loose. The adjacent deck may show some signs of anchors loosening. There may be minor cracking and/or spalling of the block out concrete. There may be minor leaking resulting in little or no damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete, seal cracks and inject epoxy

Condition State 3 The seal may be heavily damaged. Blocks may be loose but still connected. Anchors may be loose or exposed. The adjacent deck is heavily spalled and/or has wide cracks. The joint may be banging against the shelf with passage of trucks. The shelves may be beginning to break away from the deck or showing horizontal/vertical displacement. Minor corrosion or debris on elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete seal, cracks, retighten anchor bolts and inject epoxy
3) Replace segments, patch and seal deck concrete and rebuild shelves

Condition State 4 Major deterioration of the joint, concrete spalled at joint, major leakage. Some anchors may have completely failed. Significant damage to the elements below.

Feasible actions:
1) DN
2) Replace segments, patch and seal deck and rebuild shelves
3) *Replace joint

Note: All measurements for this element are to be recorded in increments of individual panel lengths.

CONTINUOUS SEAL NEOPRENE JOINT

09/30/2013

This element includes: Longitudinal and transverse expansion joint devices, which utilize neoprene blocks to hold down a continuous waterproof gland.

Elem #	Description
8308	Continuous Seal Neoprene Expansion Joint (**LF**)

Condition State 1 The element shows minimal deterioration. There is little or no leakage. The blocks are secure and have no defects. Debris in joint is not causing any problems. The adjacent deck is sound. The joint is properly seated and aligned.

Feasible actions: 1) DN

Condition State 2 The seal may be punctured or ripped but still anchored. Anchors may be loose. The adjacent deck may show some signs of anchors loosening. There may be minor cracking and/or spalling of the block out concrete. There may be minor leaking resulting in little or no damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete, seal cracks and inject epoxy

Condition State 3 The seal may be heavily damaged. Blocks may be loose but still connected. Anchors may be loose or exposed. The adjacent deck is heavily spalled and/or has wide cracks. The joint may be banging against the shelf with passage of trucks. The shelves may be beginning to break away from the deck or showing horizontal/vertical displacement. Minor corrosion or debris on elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete, seal cracks, retighten anchor bolts and inject epoxy
3) Replace affected segments, patch and seal deck concrete and rebuild shelves

Condition State 4 Major deterioration of the joint, concrete spalled at joint, major leakage. Some anchors may have completely failed. Significant damage to the elements below.

Feasible actions:
1) DN
2) Replace affected segments, patch and seal deck and rebuild shelves
3) *Replace joint

ELASTOMERIC BEARING

11/12/2013

This element includes: Type I, II, and III elastomeric bearings, top and bottom plates, retainer angles and shear studs. This element also includes seismic isolation bearings made of elastomeric materials and their appurtenant components.

Elem #	Description
310	Elastomeric Bearing (**EA**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows little deterioration. Shear deformations are correct for existing temperatures.

Feasible actions: 1) DN

Condition State 3 Minor cracking, splitting or other deterioration of the elastomer may be present. Steel components may have measureable section loss. Shear deformation may be slightly excessive or in the wrong direction. Strength and/or serviceability of the bearing components are not affected.

Feasible actions: 1) DN
2) Reset bearings

Condition State 4 Advanced deterioration of the elastomer and/or steel components. Shear deformations may be excessive. Top and bottom surfaces may no longer be parallel. Loss of bearing may be imminent.

Feasible actions: 1) DN
2) Reset bearings
3) *Replace bearings and reset girders

STEEL BEARINGS

11/12/2013

This element includes: Steel rocker and roller, gear pin and ratchet, rocker pin, and sliding plate assemblies consisting of bottom and top plates, pintels, leveling plates, retainers and bolts not subject to deck drainage through joints.

Elem #	Description
8316	Moveable Steel Bearings Below Continuous Decks (**EA**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows little deterioration. If a paint system is present, it may have surface rust with minor pitting. The bearing has minimal debris and does not affect movement. Vertical and horizontal alignment are within design limits. Any lubrication system is functioning properly.

Feasible actions:
1) DN
2) *Wash

Condition State 3 The steel may show advanced corrosion with measureable section loss. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Debris buildup is affecting bearing movement. Bearing alignment is tolerable.

Feasible actions:
1) DN
2) Minor repairs including cleaning debris and/or spot painting
3) Rehabilitate, sandblast and recoat and/or reset bearing devices

Condition State 4 Corrosion is advanced. There may be loss of section of the supporting member sufficient to warrant supplemental supports or load restrictions. Bearing alignment may be beyond tolerable limits. Shear keys may have failed. The lubrication system, if any, may have failed. There may be significant movement or pounding under traffic.

Feasible actions:
1) DN
2) Rehabilitate and/or reset bearing device
3) *Replace bearing

STEEL BEARINGS BELOW JOINTS

11/12/2013

This element includes: Standard steel rocker and roller, gear pin and ratchet, rocker pin and sliding plate assemblies consisting of bottom and top plates, pintels, leveling plates, retainers and bolts.

Elem #	Description
311	Moveable Steel Bearings Below Discontinuous Deck Joints (**EA**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows little deterioration. If a paint system is present, it may have surface rust with minor pitting. The bearing has minimal debris and does not affect movement. Vertical and horizontal alignment are within design limits. Any lubrication system is functioning properly.

Feasible actions: 1) DN
2) *Wash

Condition State 3 The steel may show localized advanced corrosion with measurable section loss (Bearing could be cleaned up and reused). The assemblies may have moved enough to cause minor cracking in the supporting concrete. Debris buildup is affecting bearing movement. Bearing alignment is tolerable.

Feasible actions: 1) DN
2) Minor repairs including cleaning debris and/or spot painting
3) Rehabilitate, sandblast and recoat and/or reset bearing devices

Condition State 4 Corrosion is advanced, sections have been lost. There may be significant horizontal or vertical misalignment to warrant supplemental supports or load restrictions. Bearing alignment may be beyond tolerable limits. Shear keys may have failed. The lubrication system, if any, may have failed. There may be significant movement or pounding under traffic.

Feasible actions: 1) DN
2) Rehabilitate, sandblast and recoat and/or reset bearing device
3) *Replace bearing

CLUSTER BEARINGS

08/19/2013

This element includes: Steel cluster bearings. Also included are top and bottom plates, retainers and anchor bolts.

Elem #	Description
312	Enclosed/Concealed Bearing or Bearing System (**EA**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows little deterioration. There are no vertical or horizontal offsets. The supported member is stable under traffic. Internal corrosion is minimal. Any lubrication system is functioning properly.

Feasible actions: 1) DN

Condition State 3 Both vertical and horizontal offsets are within the capability of the bearings and are not yet significant. The bearing may exhibit minimal vertical movement under traffic. There may be insignificant reduction of bearing. Debris and/or corrosion is affecting bearing movement.

Feasible actions:
1) DN
2) Minor repairs, replace covers, wash/lubricate and shim
3) Rehabilitate unit

Condition State 4 Vertical and/or horizontal offsets are significant indicating bearing failures. There may be significant vertical movement under traffic. There may be significant reduction of bearing. The lubrication system, if any, may have failed.

Feasible actions:
1) DN
2) Rehabilitate unit
3) *Replace unit

FIXED BEARING

11/12/2013

This element includes: Fixed bearing plates flat or rounded, and fixed pin plate girder bearings. Pintels, anchor bolts, top and bottom plates and shim plates are also included.

Elem #	Description
313	Fixed Bearing (**EA**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows little deterioration. If a paint system is present, it may have surface rust with minor pitting. Vertical and horizontal alignments are within design limits. Any lubrication system is functioning properly.

Feasible actions:
1) DN
2) *Wash

Condition State 3 Steel may show advanced corrosion with measurable section loss. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Debris build up is affecting bearing rotation. Bearing alignment is tolerable.

Feasible actions:
1) DN
2) Minor repairs including cleaning debris and spot paint
3) Rehabilitate sandblast and recoat, and/or reset bearings

Condition State 4 Corrosion is advanced. There may be significant horizontal or vertical misalignment to warrant supplemental supports or load restrictions. Shear keys may have failed. The lubrication system, if any, may have failed. There may be significant movement or pounding under traffic.

Feasible actions:
1) DN
2) Rehabilitate, sandblast and recoat, and/or reset bearings
3) *Replace bearing

POT BEARING

11/12/2013

This element includes: Those high load bearings with confined elastomer. The bearing may be fixed against horizontal movement, guided to allow sliding in one direction or floating to allow sliding in any direction.

Elem #	Description
314	Pot Bearing (**EA**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows minimal deterioration. The paint or other anti-corrosion system may have surface rust with minor pitting. The bearing has minimal debris and does not affect movement. Vertical and horizontal alignment are within design limits. Any lubrication system is functioning properly.

Feasible actions:
1) DN
2) *Wash and/or spot paint

Condition State 3 The anti-corrosion system may show some corrosion with measurable section loss. Debris buildup is affecting bearing movement. Bearing alignment and load carrying capacity is tolerable. Minor amounts of elastomer may be extruding from the device.

Feasible actions:
1) DN
2) *Wash and/or spot paint
3) Rehabilitate bearing devices

Condition State 4 Corrosion is advanced. Bearing alignment and load carrying capacity may be beyond limits. Shear keys and the lubrication system, if any, may have failed. Elastomer may be actively extruding from the device.

Feasible actions:
1) DN
2) Rehabilitate bearing devices
3) *Replace bearings

APPROACH SPANS

09/30/2013

These elements include: Those structural (non-pavement) sections behind the bridge abutment which do not derive support by continuous contact with soil *and no provision for access was provided for in the original construction.* They may span a vaulted abutment or span alongside an approach pavement at a widened cross-section. They may be multiple elements separated by longitudinal joints.

Elem #	Description
320	P/S Concrete Approach Span (**SF**)
321	Concrete Approach Slab (**SF**)
8322	Concrete Approach Beam (**SF**)

Condition State 1 The span shows no sign of deterioration other than superficial surface cracks.

Feasible actions: 1) DN

Condition State 2 Minor cracking, spalls may be present but they do not affect the ability of the span to carry traffic. Edge joints may be unsealed allowing water flow through the embankment.

Feasible actions:
1) DN
2) Seal cracks, and/or edges
3) Rehabilitate affected sections

Condition State 3 Cracks may extend completely through the span cross-section, but the span does not act as if it is broken. Spalls may be heavy and/or reinforcement may be exposed but they do not affect the structural integrity of the span.

Feasible actions:
1) DN
2) Seal cracks and/or edges
3) *Replace approach

Condition State 4 The span is broken or rocks under traffic loads. Settlement is excessive and cannot be corrected without increasing the size of the span. Large spalls in the top surface and/or exposed main reinforcement are present, which affect the structural integrity of the span.

Feasible actions:
1) DN
2) *Place overlay
3) *Replace approach

APPROACH PAVEMENT

09/30/2013

This element includes: Concrete or bituminous pavement sections behind the bridge abutment, which derive support by continuous contact with soil.

Elem #	Description
8323	Approach Pavement (**EA**)

Condition State 1 The concrete or bituminous pavement has not settled and shows no sign of deterioration other than superficial surface cracks.

Feasible actions: 1) DN

Condition State 2 Minor cracking, spalls may be present but they do not affect the ability of the concrete or bituminous pavement to carry traffic. Settlement may be occurring, which increases the traffic impact on the bridge.

Feasible actions:
1) DN
2) Seal cracks
3) Place overlay

Condition State 3 Cracks may extend completely through the pavement cross-section, but the concrete or bituminous pavement does not act as if it is broken. Spalls may be heavy but they do not affect the structural integrity of the concrete or bituminous pavement. Settlement may be occurring, which increases the traffic impact on the bridge.

Feasible actions:
1) DN
2) Place overlay
3) Replace approach

Condition State 4 The concrete or bituminous pavement is broken. Settlement is excessive and cannot be corrected without increasing the size of the slab.

Feasible actions:
1) DN
2) Place overlay
3) Replace approach

Note: Always will have an approach pavement except for rock and dirt approaches.

METAL BRIDGE RAILING

11/12/2013

This element includes: All types of railings primarily constructed of metal.

Elem #	Description
330	Metal Bridge Railing (**LF**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows minimal deterioration. The paint or anticorrosive system may have edge corrosion up to system failure with surface rust and minor pitting. Minor impact damage.

Feasible actions: 1) DN
2) *Clean and paint

Condition State 3 This element shows moderate deterioration. The paint or anticorrosive system has failed with measurable section loss up to 1/16” per face. Moderate impact damage.

Feasible actions: 1) DN
2) *Clean and paint
3) Rehabilitate railing

Condition State 4 This element shows advanced deterioration. Corrosion and/or loss of section is greater than 1/16” per face. Severe impact damage.

Feasible actions: 1) DN
2) Rehabilitate railing
3) *Replace railing

CONCRETE BRIDGE RAILING

Revised 03/14/14

This element includes: All types of railings primarily constructed of concrete. This includes metal handrails or bicycle rails if attached to concrete barriers.

Elem #	Description
331	Concrete Bridge Railing (**LF**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows minimal deterioration. There may be discoloration, efflorescence and/or minor cracking but without effect on strength and/or serviceability. Minor impact damage.

Feasible actions:
1) DN
2) *Apply protective coat

Condition State 3 Cracks & spalls may be present but there is no loss of core concrete section. Reinforcing may be exposed with some corrosion. Moderate impact damage.

Feasible actions:
1) DN
2) *Apply protective coat
3) Seal cracks, paint reinforcement and/or patch concrete or repair metal handrail

Condition State 4 Advanced deterioration. Measurable section loss of main reinforcement and loss of core concrete section. Severe impact damage.

Feasible actions:
1) DN
2) Rehabilitate railing
3) *Replace railing

TIMBER BRIDGE RAILING

11/12/2013

This element includes: All rails primarily constructed of timber.

Elem #	Description
332	Timber Bridge Railing (**LF)**

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 There is minimal decay. There may be minor cracks, splits and/or checks. Minor impact damage.

Feasible actions: 1) DN

Condition State 3 There may be decay with or without splitting, cracking, checking or crushing but none is sufficiently advanced to affect serviceability. Moderate impact damage.

Feasible actions: 1) DN
2) Replace affected members and/or apply surface treatment

Condition State 4 Advanced deterioration. Decay, splits, cracks or crushing has produced loss of strength that may affect the serviceability of the element. Severe impact damage.

Feasible actions: 1) DN
2) Replace affected members
3) *Replace railing

OTHER BRIDGE RAILING

11/12/2013

This element includes: All rails primarily constructed of stone, masonry, etc..

Elem #	Description
333	Other Bridge Railing (**LF**)

Condition State 1 The element shows no deterioration.

Feasible actions: 1) DN

Condition State 2 The element shows minimal signs of deterioration. There may be minor cracking, corrosion and/or other minor deterioration having no affect on strength or serviceability. Minor impact damage.

Feasible actions: 1) DN

Condition State 3 Minor cracking, spalls, decay of timber portions or corrosion of metal may be present. Moderate impact damage.

Feasible actions:
1) DN
2) Patch and repair rail
3) Replace affected members

Condition State 4 Advanced deterioration. Corrosion, decay or loss of section is sufficient to warrant analysis to ascertain the impact on the serviceability or strength of the element. Severe impact damage.

Feasible actions:
1) DN
2) Replace affected members
3) *Replace rail

SCOUR/EROSION

11/12/2013

These elements include: Those occurrences when scour could cause damage to the bridge or culvert; which are identified and added as necessary by the inspector in the field during the inspection. A one each quantity should be added for every location at the bridge where scour is a problem.

Elem #	Description
8361	Pier and Abutment Scour (**EA**)
8461	Culvert Scour (**EA**)

Condition State 1: Scour exists but is little concern to the structural integrity of the bridge or unit. Insignificant damage caused by drift or collision with no misalignment of flow with substructure units and not requiring corrective action. Scour countermeasures may be in place with no significant problems.

Feasible actions:
1) DN
2) Monitor
3) Rip rap and/or *remove debris*

Condition State 2: Minor scour may have occurred. Scour countermeasures may need some repairs. Drift accumulation may be causing a change in flow.

Feasible actions:
1) DN
2) Monitor
3) Rip rap and/or *remove debris*

Condition State 3: Scour has exposed the top of footing at pile supported footings or the pile is exposed below the encasement, if present or greater than 6 feet below the natural ground line at bents. No structure misalignment or settlement noted. New countermeasures or the repair of existing countermeasures are needed.

Feasible actions:
1) DN
2) Rip rap
3) Extensive scour countermeasures including large rip rap, paved sections or channel modifications

Condition State 4: Severe scour or undermining of the footings possibly affecting the stability of the unit. An analysis of the integrity and the hydraulics of the structure are necessary.

Feasible actions:
1) DN
2) Extensive scour countermeasures
3) Provide larger opening or relief structure

SETTLEMENT

11/12/2013

These elements include: Those occurrences when settlement could cause damage to the bridge or culvert; which are identified and added as necessary by the inspector in the field during the inspection. A one each quantity should be added for each location at the bridge where settlement is a problem.

Elem #	Description
8360	Pier and Abutment Settlement (**EA**)
8460	Culvert Settlement (**EA**)

Condition State 1 Settlement exists but is little concern to the structural integrity of the bridge or unit.

Feasible actions: 1) DN

Condition State 2 Signs of visible settlement or rotation are apparent but due to earlier repairs or other factors, the settlement appears to have stabilized.

Feasible actions:
1) DN
2) Minor stabilization retrofits (cables, bearing shims, etc.)

Condition State 3 Settlement or rotation show signs of continuing and if left unarrested, could cause adverse impacts to the bridge.

Feasible actions:
1) DN
2) Minor stabilization retrofits
3) Construct cripple bents

Condition State 4 Settlement or rotation is significant enough to require repairs.

Feasible actions:
1) DN
2) Construct cripple bents
3) Replace substructure unit

ENVIRONMENT DESCRIPTIONS

Revised 03/14/14

Deck

Environment	Description
1	ADT ≤ 1700
2	1700 < ADT ≤ 4100
3	4100 < ADT ≤ 9950
4	9950 < ADT

Superstructure

Environment	Description
1	ADTT ≤ 165 or ADT Under ≤ 6200
2	165 < ADTT ≤ 385 or 6200 < ADT Under ≤ 14,800
3	385 < ADTT ≤ 1170 or 14,800 < ADT Under ≤ 27,300
4	1170 < ADTT or 27,300 < ADT Under

Substructure

Environment	Description
1	ADT Under ≤ 6,200 or Light Industry
2	6,200 < ADT Under ≤ 14,800 or Moderate Industry
3	14,800 < ADT Under ≤ 27,300 or Heavy Industry
4	27,300 < ADT Under

1) Deck

A) Deck

B) Steel superstructure elements below discontinuous deck joints including, beam ends, end diaphragms, and bearings

C) Steel substructure elements below discontinuous deck joints including, pier and abutment caps, and abutment backwalls

2) Superstructure

Includes all superstructure elements not included in the first group

3) Substructure

Includes all substructure elements not included in the first group

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8173	Non-Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**)	17
8200	**Non-Lead Painted Steel Column** (**SF**)	17
8182	Non-Lead Painted Steel Deck Truss Below Deck Joints (**SF**)	17
8124	Non-Lead Painted Steel Deck Truss (**SF**)	17
8129	Non-Lead Painted Steel Floor Beam (**SF**)	17
8192	Non-Lead Painted Steel Floor Beam Below Deck Joints (**SF**)	17
8163	**Non-Lead Painted Steel Gusset Plate (EA)**	17
8118	Non-Lead Painted Steel Open Girder (**SF**)	17
8236	Non-Lead Painted Steel Pier or Abutment Cap (**SF**)	17
8272	Non-Lead Painted Steel Pier or Abutment Cap Below Deck Joints (**SF**)	17
8162	Non-Lead Painted Steel Pin and/or Hanger (**EA**)	17
8119	Non-Lead Painted Steel Stringer (**SF**)	17
8123	Non-Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**)	17
304	Open Expansion Joint (**LF**)	32
218	**Other Abutment and Wingwall (SF)**	24
333	Other Bridge Railing (**LF**)	48
243	Other Culvert (**LF**)	27
211	Other Pier Wall (**SF**)	24
147	**Primary Cable (LF)**	23
320	P/S Concrete Approach Span (**SF**)	43
143	P/S Concrete Arch/Arch Tie (**LF**)	19
8237	P/S Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**)	19
104	P/S Concrete Closed Web/Box Girder (**LF**)	19
204	**P/S Concrete Column (SF)**	19
154	P/S Concrete Floor Beam (**LF**)	19
109	P/S Concrete Open Girder (**LF**)	19
233	P/S Concrete Pier or Abutment Cap (**LF**)	19
236	**P/S Concrete Pile Extension (SF)**	19
8142	P/S Concrete Segmental Box Girders (**LF**)	19
8361	Pier and Abutment Scour (**EA**)	49
8360	Pier and Abutment Settlement (**EA**)	50
314	Pot Bearing (**EA**)	42
301	Pourable Joint Seal (**LF**)	29
8034	Precast Concrete Deck Bare (**SF**)	1
8036	Precast Concrete Deck Protected w/ HMA Overlay (**SF**)	3
8035	Precast Concrete Deck Unprotected w/ HMA Overlay (**SF**)	2
8056	Precast Concrete Deck w/Rigid 5” Overlay (**SF**)	1

Elem #	Description	Page #
302	Preformed Joint Seal (**LF**)	30
227	**Reinforced Concrete Pile Extension (SF)**	20
148	**Secondary Cable (EA)**	23
8058	**Sidewalk** (**SF**)	14
8407	Steel Arch/Arch Tie (**LF**)	18
8402	Steel Bottom Chord Through Truss (**LF**)	18
8401	Steel Closed Web/Box Girder (**LF**)	18
8409	Steel Column or Pile Extension (**LF**)	18
240	Steel Culvert (**LF**)	25
29	Steel Deck Concrete Filled Grid (**SF**)	9
8057	**Steel Deck Concrete Filled Grid w/HMA Overlay** (**SF**)	10
28	Steel Deck Open Grid (**SF**)	8
8404	Steel Deck Truss (**LF**)	18
8408	Steel Floor Beam (**LF**)	18
8413	**Steel Gusset Plate (EA)**	18
8406	Steel Open Girder (**LF**)	18
8410	Steel Pier or Abutment Cap (**LF**)	18
8414	**Steel Pile Extension (LF)**	18
8411	Steel Pin and/or Hanger (**EA**)	18
8412	Steel Stringer (**LF**)	18
8403	Steel Through Truss Excluding Bottom Chord (**LF**)	18
300	Strip Seal Expansion Joint (**LF**)	28
216	Timber Abutment and Wingwall (**SF**)	22
146	**Timber Arch** (**LF**)	22
332	Timber Bridge Railing (**LF**)	47
206	**Timber Column (EA)**	22
31	Timber Deck Bare (**SF**)	12
8239	Timber Deck Runners (**LF**)	22
8032	Timber Deck with HMA Overlay (**SF**)	13
156	Timber Floor Beam (**LF**)	22
111	Timber Open Girder (**LF**)	22
235	Timber Pier or Abutment Cap (**LF**)	22
228	**Timber Pile Extension (EA)**	22
54	Timber Slab Bare (**SF**)	12
8055	Timber Slab with HMA Overlay (**SF**)	13
117	Timber Stringer (**LF**)	22
135	Timber Truss (**LF**)	22
8222	Unpainted Steel Abutment and Wingwall (**SF**)	15
8140	Unpainted Steel Arch/Arch Tie (**SF**)	15
120	Unpainted Steel Bottom Chord Through Truss (**SF**)	15
8101	Unpainted Steel Closed Web/Box Girder (**SF**)	15
8171	Unpainted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**)	15
201	**Unpainted Steel Column (SF)**	15
8180	Unpainted Steel Deck Truss Below Deck Joints (**SF**)	15
8130	Unpainted Steel Deck Truss (**SF**)	15
8151	Unpainted Steel Floor Beam (**SF**)	15
8190	Unpainted Steel Floor Beam Below Deck Joints (**SF**)	15
8106	Unpainted Steel Open Girder (**SF**)	15
8270	Unpainted Steel Pier or Abutment Cap Below Deck Joints (**SF**)	15
8230	Unpainted Steel Pier or Abutment Cap (**SF**)	15
8224	**Unpainted Steel Pile Extension (SF)**	15
8160	Unpainted Steel Pin and/or Hanger (**EA**)	15
8112	Unpainted Steel Stringer (**SF**)	15

Elem #	Description	Page #
8125	Unpainted Steel Through Truss Excluding Bottom Chord (**SF**)	15

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Elem #	Description	Page #
12	Concrete Deck Bare (**SF**)	1
8013	Concrete Deck Unprotected w/ HMA Overlay (**SF**)	2
8014	Concrete Deck Protected w/HMA Overlay (**SF**)	3
8018	Concrete Deck Protected w/ Thin Overlay (**SF**)	4
8022	Concrete Deck Protected w/ Rigid Overlay (**SF**)	5
8026	Concrete Deck Protected w/ Coated Bars (**SF**)	6
8027	Concrete Deck Protected w/Cathodic Protection (**SF**)	7
28	Steel Deck Open Grid (**SF**)	8
29	Steel Deck Concrete Filled Grid (**SF**)	9
30	Corrugated/Orthotropic/Etc. Deck (**SF**)	11
31	Timber Deck Bare (**SF**)	12
8032	Timber Deck with HMA Overlay (**SF**)	13
8033	Concrete Deck Protected w/ Coated Bars w/ PPC Panels (**SF**)	6
8034	Precast Concrete Deck Bare (**SF**)	1
8035	Precast Concrete Deck Unprotected w/ HMA Overlay (**SF**)	2
8036	Precast Concrete Deck Protected w/ HMA Overlay (**SF**)	3
8038	Concrete Slab Bare (**SF**)	1
8039	Concrete Slab Unprotected w/ HMA Overlay (**SF**)	2
8040	Concrete Slab Protected w/HMA Overlay (**SF**)	3
8044	Concrete Slab Protected w/ Thin Overlay (**SF**)	4
8048	Concrete Slab Protected w/ Rigid Overlay (**SF**)	5
8052	Concrete Slab Protected w/ Coated Bars (**SF**)	6
8053	Concrete Slab Protected w/Cathodic Protection (**SF**)	7
54	Timber Slab Bare (**SF**)	12
8055	Timber Slab with HMA Overlay (**SF**)	13
8056	**Precast Concrete Deck w/Rigid 5” Overlay** (**SF**)	1
8057	**Steel Deck Concrete Filled Grid w/HMA Overlay** (**SF**)	10
8058	**Sidewalk** (**SF**)	14
8101	Unpainted Steel Closed Web/Box Girder (**SF**)	15
102	Lead Painted Steel Closed Web/Box Girder (**SF**)	16
8103	Non-Lead Painted Steel Closed Web/Box Girder (**SF**)	17
104	P/S Concrete Closed Web/Box Girder (**LF**)	19
105	Concrete Closed Web/Box Girder (**LF**)	20
8106	Unpainted Steel Open Girder (**SF**)	15
107	Lead Painted Steel Open Girder (**SF**)	16
8108	Keyway (**LF**)	21
109	P/S Concrete Open Girder (**LF**)	19
110	Concrete Open Girder (**LF**)	20
111	Timber Open Girder (**LF**)	22
8112	Unpainted Steel Stringer (**SF**)	15
113	Lead Painted Steel Stringer (**SF**)	16
117	Timber Stringer (**LF**)	22
8118	Non-Lead Painted Steel Open Girder (**SF**)	17
8119	Non-Lead Painted Steel Stringer (**SF**)	17
120	Unpainted Steel Bottom Chord Through Truss (**SF**)	15
8121	Lead Painted Steel Bottom Chord Through Truss (**SF**)	16
8122	Non-Lead Painted Steel Bottom Chord Through Truss (**SF**)	17
8123	Non-Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**)	17
8124	Non-Lead Painted Steel Deck Truss (**SF**)	17
8125	Unpainted Steel Through Truss Excluding Bottom Chord (**SF**)	15
8126	Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**)	16
8128	Non-Lead Painted Steel Arch/Arch Tie (**SF**)	17

Elem #	Description	Page #
8129	Non-Lead Painted Steel Floor Beam (**SF**)	17
8130	Unpainted Steel Deck Truss (**SF**)	15
8131	Lead Painted Steel Deck Truss (**SF**)	16
135	Timber Truss (**LF**)	22
8140	Unpainted Steel Arch/Arch Tie (**SF**)	15
141	Lead Painted Steel Arch/Arch Tie (**SF**)	16
8142	P/S Concrete Segmental Box Girder (**LF**)	19
143	P/S Concrete Arch/Arch Tie (**LF**)	19
144	Concrete Arch/Arch Tie (**LF**)	20
146	**Timber Arch (LF)**	22
147	**Primary Cable (LF)**	23
148	**Secondary Cable (EA)**	23
8151	Unpainted Steel Floor Beam (**SF**)	15
152	Lead Painted Steel Floor Beam (**SF**)	16
154	P/S Concrete Floor Beam (**LF**)	19
155	Concrete Floor Beam (**LF**)	20
156	Timber Floor Beam (**LF**)	22
8160	Unpainted Steel Pin and/or Hanger (**EA**)	15
161	Lead Painted Steel Pin and/or Hanger (**EA**)	16
162	**Lead Painted Steel Gusset Plate (EA)**	16
8162	**Non-Lead Painted Steel Pin and/or Hanger (EA)**	17
8163	**Non-Lead Painted Steel Gusset Plate (EA)**	17
8171	Unpainted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**)	15
8172	Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**)	16
8173	Non-Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints **(EA**)	17
8180	Unpainted Steel Deck Truss Below Deck Joints (**SF**)	15
8181	Lead Painted Steel Deck Truss Below Deck Joints (**SF**)	16
8182	Non-Lead Painted Steel Deck Truss Below Deck Joints (**SF**)	17
8190	Unpainted Steel Floor Beam Below Deck Joints (**SF**)	15
8191	Lead Painted Steel Floor Beam Below Deck Joints (**SF**)	16
8192	Non-Lead Painted Steel Floor Beam Below Deck Joints (**SF**)	17
8200	**Non-Lead Painted Steel Column (SF)**	17
8201	**Unpainted Steel Column (SF)**	15
202	**Lead Painted Steel Column (SF)**	16
204	**P/S Concrete Column (SF)**	19
205	**Concrete Column (SF)**	20
206	**Timber Column** (**EA**)	22
8209	**MSE Abutment and Wingwall (SF)**	19
210	Concrete Pier Wall (**SF**)	20
211	Other Pier Wall (**SF**)	24
215	Concrete Abutment and Wingwall (**SF**)	20
216	Timber Abutment and Wingwall (**SF**)	22
218	**Other Abutment and Wingwall (SF)**	24
8220	Non-Lead Painted Steel Abutment and Wingwall (**SF**)	17
8221	Lead Painted Steel Abutment and Wingwall (**SF**)	16
8222	Unpainted Steel Abutment and Wingwall (**SF**)	15
8224	**Unpainted Steel Pile (SF)**	15
225	**Lead Painted Steel Pile Extension (SF)**	16
226	**Prestressed Concrete Pile Extension (SF)**	19
227	**Reinforced Concrete Pile Extension (SF)**	20
228	**Timber Pile Extension (LF)**	22

Elem #	Description	Page #
8230	Unpainted Steel Pier or Abutment Cap (**SF**)	15
231	Lead Painted Steel Pier or Abutment Cap (**SF**)	16
233	P/S Concrete Pier or Abutment Cap (**LF**)	19
234	Concrete Pier or Abutment Cap (**LF**)	20
235	Timber Pier or Abutment Cap (**LF**)	22
8236	Non-Lead Painted Steel Pier or Abutment Cap (**SF**)	17
8237	P/S Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**)	19
8238	Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**)	20
8239	Timber Deck Runners (**LF**)	22
240	Steel Culvert (**LF**)	25
241	Concrete Culvert (**LF**)	26
243	Other Culvert (**LF**)	27
8246	Non-Lead Painted Steel Pile Extension	17
8270	Unpainted Steel Pier or Abutment Cap Below Deck Joints (**SF**)	15
8271	Lead Painted Steel Pier or Abutment Cap Below Deck Joints (**SF**)	16
8272	Non-Lead Painted Steel Pier or Abutment Cap Below Deck Joints (**SF**)	17
300	Strip Seal Expansion Joint (**LF**)	28
301	Pourable Joint Seal (**LF**)	29
302	Preformed Joint Seal (**LF**)	30
303	Modular Joints (**LF**)	31
304	Open Expansion Joint (**LF**)	32
305	Finger Joints without Trough (**LF**)	33
8306	Finger Joints with Trough (**LF**)	34
8307	Neoprene Expansion Joint (**LF**)	35
8308	Continuous Seal Neoprene Expansion Joint (**LF**)	36
310	Elastomeric Bearing (**EA**)	37
311	Moveable Steel Bearings Below Discontinuous Deck Joints (**EA**)	39
312	Enclosed/Concealed Bearing or Bearing System (**EA**)	40
313	Fixed Bearing (**EA**)	41
314	Pot Bearing (**EA**)	42
8316	Moveable Steel Bearings Below Continuous Decks (**EA**)	38
320	P/S Concrete Approach Span (**SF**)	43
321	Concrete Approach Slab (**SF**)	43
8322	Concrete Approach Beam (**SF**)	43
8323	Approach Pavement (**EA**)	44
330	Metal Bridge Railing (**LF**)	45
331	Concrete Bridge Railing (**LF**)	46
332	Timber Bridge Railing (**LF**)	47
333	Other Bridge Railing (**LF**)	48
8360	Pier and Abutment Settlement (**EA**)	50
8361	Pier and Abutment Scour (**EA**)	49
8401	Steel Closed Web/Box Girder (**LF**)	18
8402	Steel Bottom Chord Through Truss (**LF**)	18
8403	Steel Through Truss Excluding Bottom Chord (**LF**)	18
8404	Steel Deck Truss (**LF**)	18
8406	Steel Open Girder (**LF**)	18
8407	Steel Arch/Arch Tie (**LF**)	18
8408	Steel Floor Beam (**LF**)	18
8409	Steel Column or Pile Extension (**LF**)	18
8410	Steel Pier or Abutment Cap (**LF**)	18
8411	Steel Pin and/or Hanger (**EA**)	18
8412	Steel Stringer (**LF**)	18
8413	**Steel Gusset Plate (EA)**	18
8414	**Steel Pile (LF)**	18

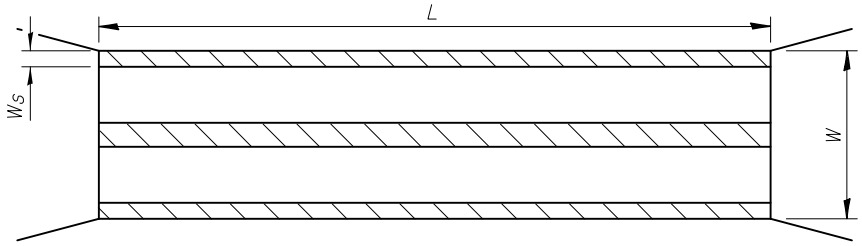
Elem #	Description	Page #
8460	Culvert Settlement (**EA**)	50
8461	Culvert Scour (**EA**)	49

Appendix

Deck/Slab

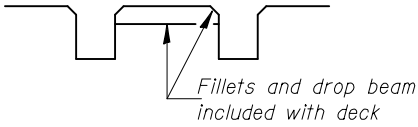
Quantity=L xW=SF

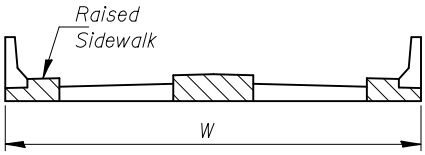
Deteriorated areas will be measured only in the riding surface.

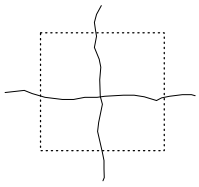


Areas not rated:

Note:
If optional sidewalk element is used, the sidewalk quantity will be length x Ws (width of sidewalk). The deck quantity is unchanged.

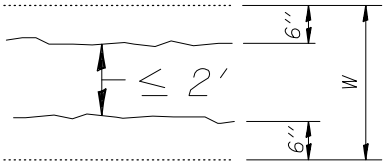






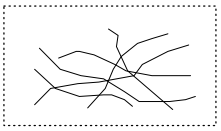
CS2 area = 1 s.f.

INTERSECTING CRACKS



CS2 area = W x length of crack

PARALLEL CRACKS



CS2 area = rectangular shape

MAP CRACKS, SPALLS OR DELAMINATIONS

Protection System Unpainted/Painted Steel Elements

Quantity= Total SF of structural steel from CAPPS

Steel beam ends are not subtracted from the total structural quatity.

Diaphragms may be assumed to increase total quantity by 10% but interior diaphragms remain in Condition State 1. End diaphragms can only effect the condition state of the beam ends. Judgement should be used to determine to what degree the effect is on the condition state of the beam ends to which they are attached.

Condition State 2 quantities should be recorded including the entire flange face and the portions of web face which contain this level of deficiency.

Condition State 3 and 4 quantities should be recorded including the entire flange face and/or the entire web face which contain this level of deficiency, except for those isolated corrosion cells in Condition State 3, which are recorded as one square foot.

Concrete Elements

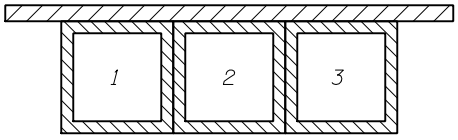
Girder Quantity = (L - X) (# of Girders) =LF

X = (# of Deck Joints/Span) (5) = LF

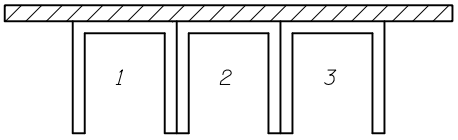
Abutment/Pier Quantity = L x W = SF

Length and width will be taken from as built plans. No field correction is necessary unless a gross error is apparent.

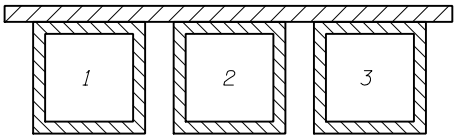
Girder Measurements Cont'd.



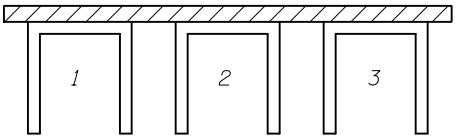
3 Girders



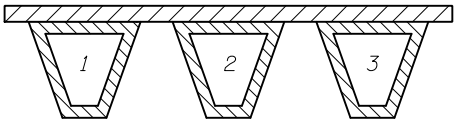
3 Girders



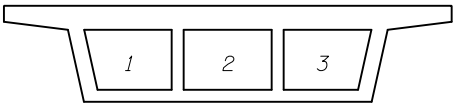
3 Girders



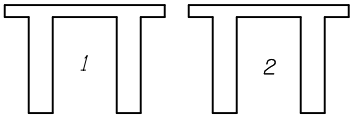
3 Girders



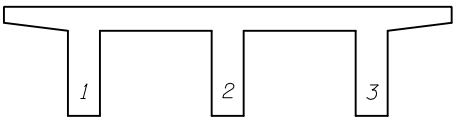
3 Girders



3 Girders

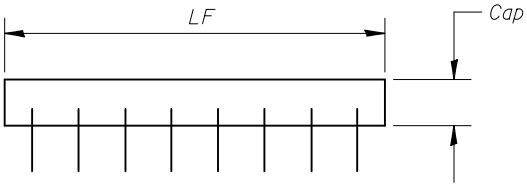


2 Girders



3 Girders

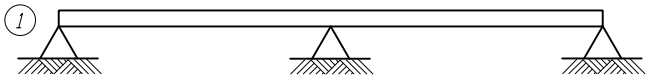
Pile Bent Cap



Bearings

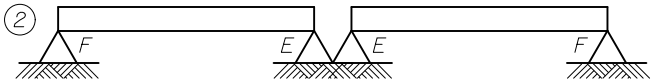
Quantity = EA

Integral Abutment/Two span Continuous



Beam	Element #	Quantity
1	316	1
2	311	2
	313	2

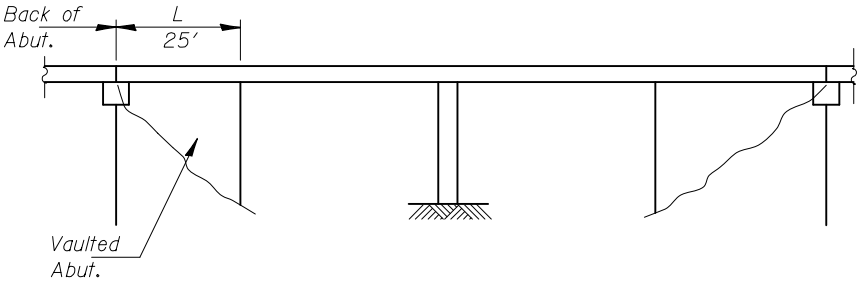
Two span Discontinuous

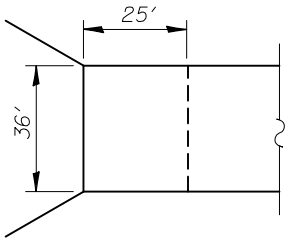


Bearings that cannot be seen are not included in Pontis.

Approach Span is rigidly supported on both ends

Quantity= L x W= SF



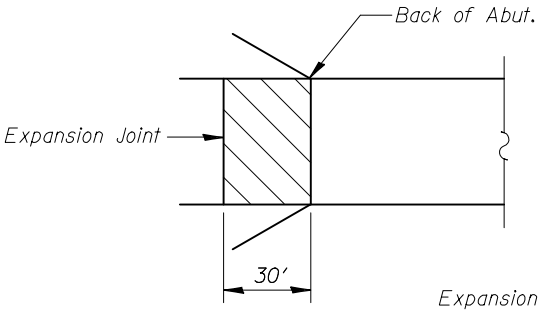


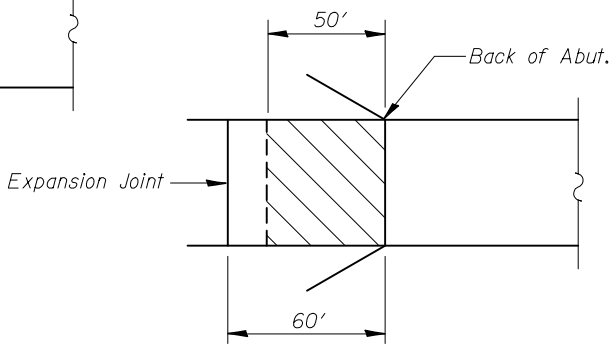
Q= (2)(25)(36)= 1800 SF.

Approach Pavement is ground supported

Quantity= EA

Maximum area of consideration 50 Ft. from back of abutment.

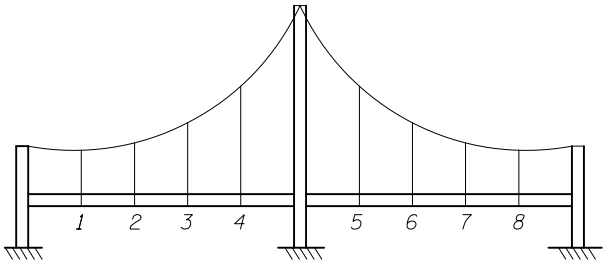




Approach Pavement

Secondary Cable

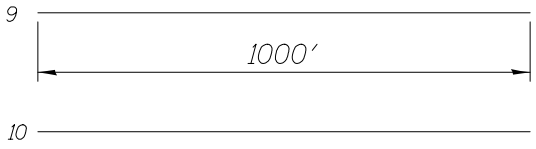
Quantity = EA



Total Quantity= (2) * (8) = 16EA

Primary Cable

Quantity = LF



Top View

Total Quantity= (2) * (1000′) = 2000 LF

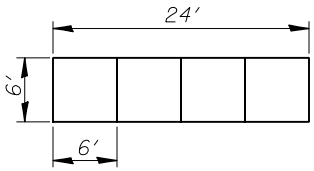
(measured along length of cable)

Culverts

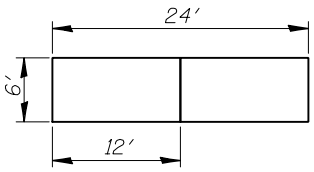
Quantity = L x (# of Barrels) = LF

One Barrel = 5 Ft - 7.5 Ft

Two Barrels => 7.51 Ft



Four Barrels



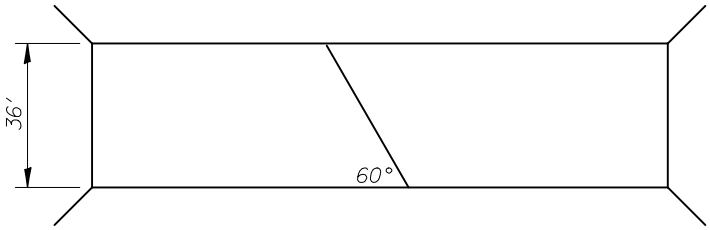
Four Barrels

Culvert environments are determined using subtructures criteria except when the top slab receives direct traffic loads (no fill). When direct traffic loads are received the environment is determined from the worst of the three categories on page 49.

Joints

Quantity = LF

Measurements taken along joint.

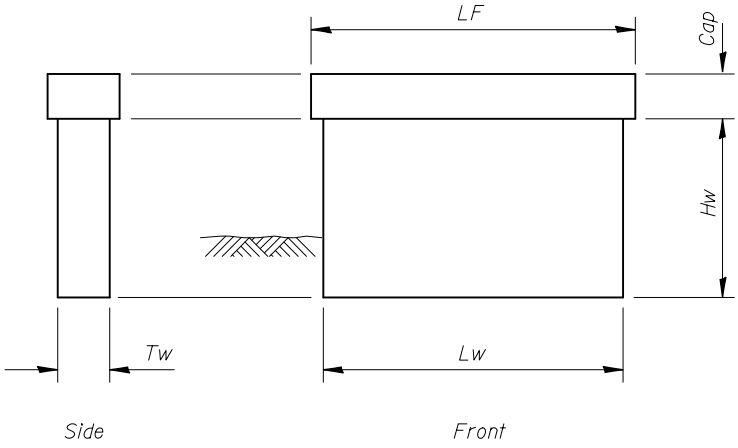


Q = (36)/Sin 60° = 41.6′

Timber Elements

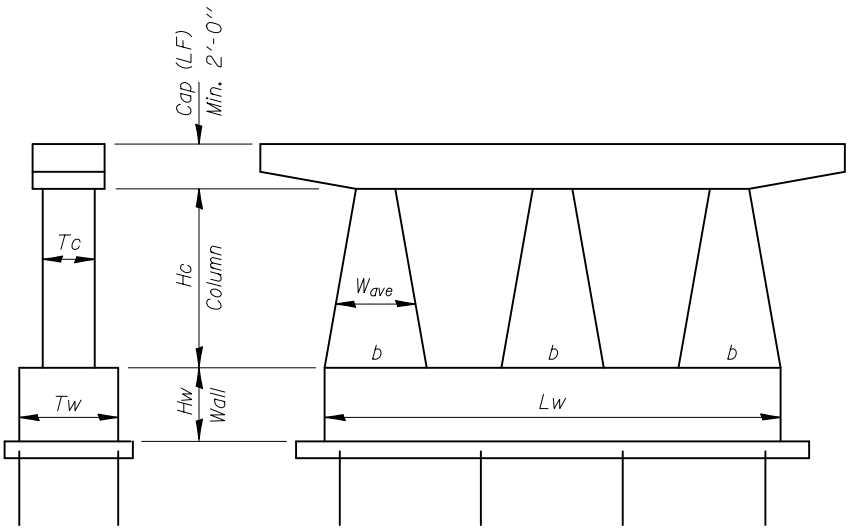
Quantity = L x (# of Girders) = LF

Encased Pile Bent



Area Pier Wall = Hw (Lw +Tw) 2

Column



One column area = Hc x 2 (W_{ave} + Tc)
Pier wall area = Hw x 2 (Lw + Tw) + (Tw x Lw - 3b x Tc)

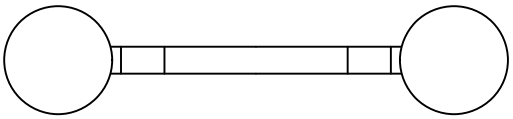
Notes:

Pier and Column (SF) : When "Condition State" of front and back areas coincide. Each area is recorded in the total for each condition state.

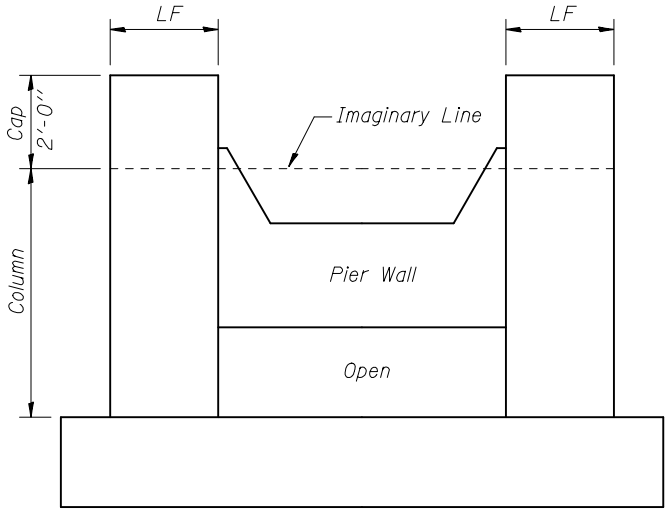
Cap (LF) : When "Condition State" of Front and Back areas coincide. The rated lineal length is the longest length and not the sum. Worst "Condition State" governs for the coincident length.

Pier Cap

Case 1

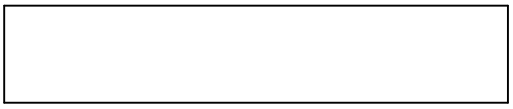


Plan

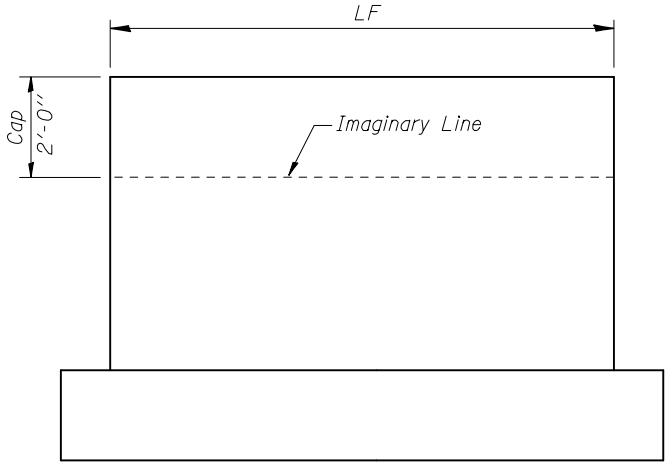


Elevation

Case 2



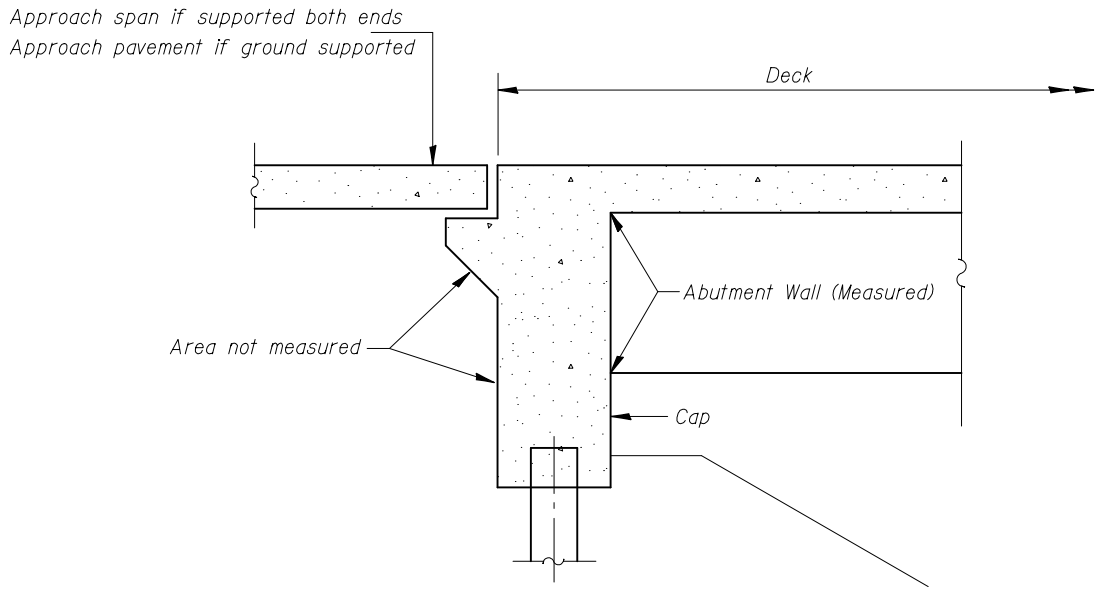
Plan



Elevation

Notes: If there is no visible division between the pier wall and the cap, 2 feet below top of wall must be considered pier cap.

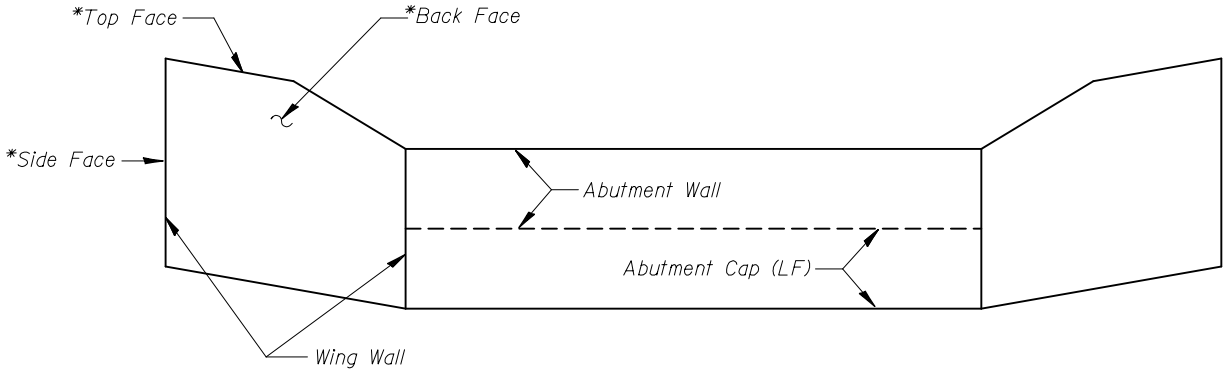
Integral Abutment



Integral abutment must be separated into 3 elements as follows:

1.) Abutment wall
2.) Deck
3.) Cap

Concrete Abutment Wall and Wing Wall: measure only the front faces

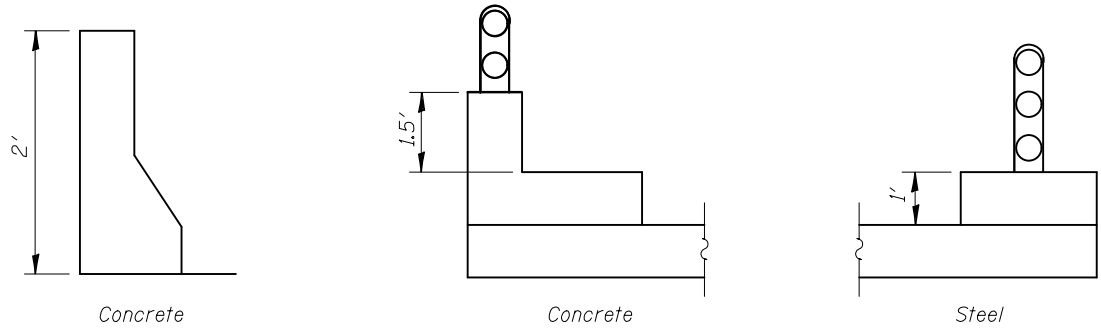


* Not Measured

Railing

Quantity = LF

Type of railing is determined by what material will primarily resist impact loads.



The following elements have to be field determined and recorded only when deficiencies exist elements are not found in the plans.

1. Scour/Erosion

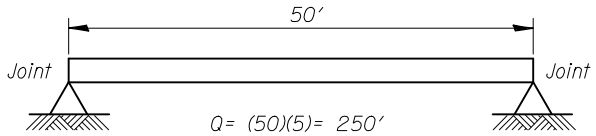
Quantity = EA

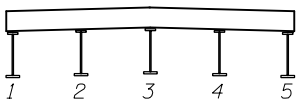
2. Settlement

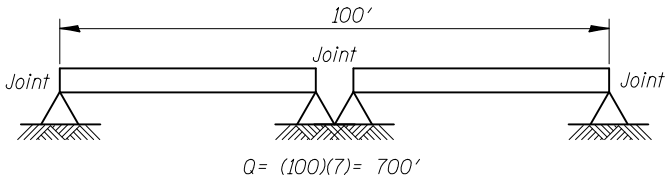
Quantity = EA

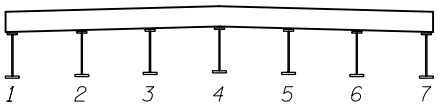
3. Steel Damaged Elements

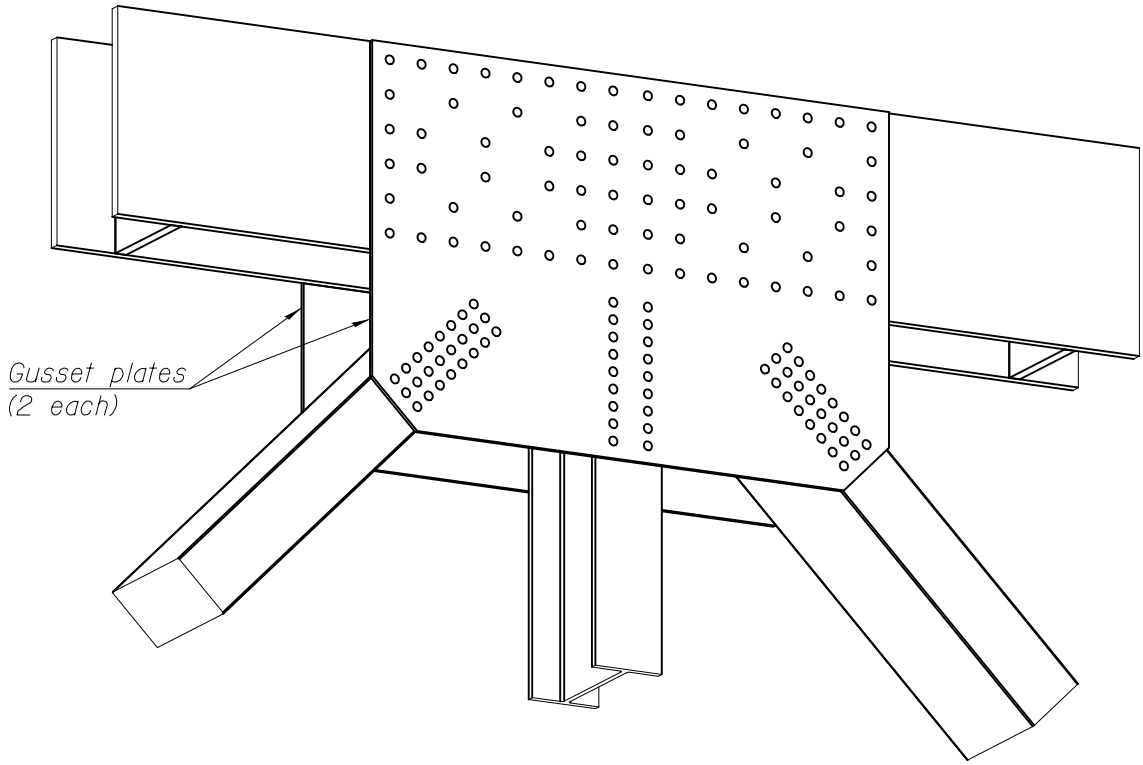
Quantity= L x (# of Girders)= LF











GUSSET PLATES