Appendix B. Field Investigation Report
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General Information
The scope of this field investigation was to gather information on the existing bridge sufficient to be used to estimate remaining life, repair needs, and rehabilitation costs. The information was gathered visually from the ground, the roadway and the adjacent pedestrian bridge. Binoculars were used intermittently as deemed appropriate to obtain more detailed information readily attainable. The scope of work was set to be conducted in a one-day site visit.

The field investigation was performed August 6th, 2019 and August 7th, 2019 by a field crew consisting of Brian Zeiger, PE with HDR Engineering, Inc. and Terry Stowell with Olsson Associates. The bridge was accessed on foot from the north approach, via a local access road under the north end span, and from the south approach. No equipment was used for access. The bridge was open to traffic at all times for this field investigation.

As a condition of the overall scope of the project it was assumed that the bridge will need a new deck for all options and therefore the deck was excluded from the investigation. General photos of the deck and rail were included for information only.

Bridge Description
The bridge over the Current River (G0804) was built in 1924, has (60’-130’-130’-130’-60’) filled arch spans with 34’ filled deep abutments. The bridge has ratings of deck -5, superstructure-5 substructure-6, and has an 18’ roadway. The bridge is posted for centerline only. Several of the overhang supports have significant deterioration. The deck between the arch walls is supported by the fill between the arch walls. The bridge is over the Current River within the National Park. There are trails, canoe rental businesses and canoe access to the river close by. There is a pedestrian / utility bridge located just downstream and parallel to G0804. The overall bridge elevation is shown looking southwest in the following photograph.
Elevation of Bridge

(Aboutment, pier and bracket numbering shown)
Typical Section at Midspan of Arch

Typical Section at Counterforted Sidewall
Typical Section at Pier

- Sidewalls
- Brackets and Coping at CL Pier
Results of Field Investigation

Deck and Barrier
The scope of services for this project listed the project condition that the deck and barrier would be replaced under any of the rehabilitation scenarios developed for this project. The deck and barriers were therefore excluded from analysis during the site visit. However, a cursory observation was made for informational purposes. The following photographs show various areas of collision damage and deflection of the rails, the cracking of the asphalt wearing surface of the roadway and small deck spalls that were observed during the site visit.

Collision Damage to the Railing
Condition of Wearing Surface

Deck Spall
Superstructure

The superstructure of the bridge consists of five spans of filled spandrel arches. The fill material is from local sources with drains and drainage materials installed at the bases of the arch rings at the piers. The side walls have joints at the bracket locations and are either cantilevered walls or have counterforts install for support. Refer back to the typical sections for views of these details.

In general the arches are in good condition with areas of spalling and staining, primarily from leakage at the vertical joints in the sidewalls and the brackets. This leakage appears to be due in large part to the failure of the joint material between sections of the sidewall. The brackets supporting the deck cantilevers are heavily deteriorated throughout the structure. Several locations exhibit loss of up to 40% of the bracket area under the deck. Heavy spalling with exposed reinforcing steel is also prevalent.

One additional observation on the superstructure was the differential lateral movement between the sidewall sections. The section of sidewall over the pier that extends to each joint is either connected from side to side with a floor beam or there are counterforts on the pier side of the joint. The wall that is on the opposite side of the joint is not likewise supported and appears to have deflected outward on the order of ¾” per side. This results in a face of barrier dimension approximate 1 ½” wider than over the pier.

The following photographs represent examples of these superstructure observations.
Leakage from Sidewall Joints

Heavy Deterioration with Loss of Bracket Support Area
Substructure

The substructure elements are in generally fair condition. There are areas of scaling, staining, and deterioration on most substructure members. No obvious signs of settlement were observed. The abutments generally exhibit the spalling cracking and delamination on the outstanding corners and adjacent to the vertical joints. The piers exhibit the same types of deterioration and additionally scaling on the piers was observed and indications of scour holes at piers 3 and 4. The following photographs highlight the typical deterioration of the substructure elements.
Cracking and Delamination at Abutments

Scaling Along Pier Foundations
Route 19 over Current River (Br. G0804)
Rehabilitation / Replacement Concept Study
Report of Field Investigation

Spalling on Pier Surfaces

Scour Hole at Pier 3
Summary
The bridge is in generally fair condition with consistent areas of deterioration throughout the elements. Most of this deterioration is due to poor drainage of the fill material and failure of the expansion joint filler in the vertical joints of the brackets and sidewalls.

Recommendations
Based on the observations of this site visit, rehabilitation of this structure should include the following items:

- Replacement of the barrier and the wearing surface.
- Improvement of the drainage system for the arch fill material.
- Replacement of the joint filler in the sidewalls.
- Repair or replacement of the numerous deteriorated brackets.
- Concrete repair and possible chloride remediation at deteriorated concrete areas and areas of high chloride levels in walls, piers and arches.
- Fill and protection of the observed scour holes
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OVERLAY

* Type of existing overlay:   ☑ None   ☐ Asphalt   ☐ Low Slump   ☐ Silica Fume   ☐ Latex   ☐ Epoxy   ☐ Other:  

* Existing overlay thickness:  5-7 "  

* Year overlay was applied:  2010  ☐ Unknown  

* % of overlay repaired or patched:  [ ] %  

* Replace overlay:  ☐ Yes  ☐ No  

* Notes:  Asphalt wearing surface width along concrete cantilever curb of 4’ on each side and earth fill in center.

2A DECK REPAIRS  

(Deck repair quantities are required even if a Deck Test request has been ordered for this structure.)

* Half-sole repairs:  [ ] sq. ft.  

(round up to the nearest 50 sq. ft.)

* Full-depth repairs:  [ ] sq. ft.  

(round up to the nearest 25 sq. ft.)

* Slab edge repairs:  [ ] lin. ft.  

(covers the outer 4” of the slab edge)

* Superstructure repair (Unformed):  [ ] sq. ft.  

(covers the remaining slab cantilever beyond the outer 4”)

* Clean & seal slab edge:  [ ] lin. ft.  

(in lieu of edge repairs)

* Cantilever replacement:  [ ] 1204 lin. ft.  

* Total surface hydro demolition bridge deck:  ☐ Yes  ☐ No  

(half-sole and full depth repair quantities still required)

* Full deck replacement (redeck):  ☐ Yes  ☐ No  ☐ Optional  

* Superstructure replacement:  ☐ Yes  ☐ No  ☐ Optional  

* Full bridge replacement:  ☐ Yes  ☐ No  ☐ Optional  

(Deck repair quantities required for cost comparison of alternatives)

* How were the quantities obtained?  ☑ Visual  ☐ Bridge Inspection Report  ☐ Sounded  ☐ Other:  

* Notes:  

Picture #: 001
### DECK REPAIRS CONT.

#### * ISSUES \ PROBLEMS WITH PRECAST PRESTRESSED DECK PANELS

<table>
<thead>
<tr>
<th>Spans</th>
<th>At Panel Jt.</th>
<th>Btwn (mid)</th>
<th>Location in Span</th>
<th>Deterioration</th>
<th>Describe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

- **Notes:**

   (Deterioration may include water saturation, efflorescence, rust staining, cracking, spalling, exposed steel, disintegration of panel edges at joints, etc. Typically observed at or near panel joints. The location and "Type" of deterioration should be recorded.)

---

### APPROACH SLABS

- **Is there a bridge approach slab in place?**  
  - Yes  
  - No

- **Type:**  
  - Concrete  
  - Asphalt  
  - Other

- **Is there a roadw. approach pavement in place?**  
  - Yes  
  - No

- **Type:**  
  - Concrete  
  - Asphalt  
  - Other

- **Is the approach slab sinking at the end bent?**  
  - N/A  
  - Yes  
  - No

- **Are repairs needed to the bridge approach slab driving surface?**  
  - Yes  
  - No

   (Typically a roadway item but will be reported to district on the Bridge Memorandum.)

- **Notes:**

   

---

**Picture #**
SLAB DRAINS

* Is the drainage system working adequately?  ☐ Yes  ☑ No

* Recommendations:  Provide drains during rehabilitation or replacement of existing bridge.

* Notes:  No deck drains in place.

CURBS & RAILS

* Existing curb (left side):
  ☐ Safety Barrier Curb  ☐ Curb/parapet  ☐ Blockout  ☐ Thrie Beam  ☐ Baluster  ☐ Steel Channel
  ☐ Other  ☐ Handrail  ☐ Fence
  ☐ Does curb need repair ☐ Yes  ☑ No
  ☑ Curb repair  602  lin. ft.

* Existing curb (right side):
  ☐ Safety Barrier Curb  ☐ Curb/parapet  ☐ Blockout  ☐ Thrie Beam  ☐ Baluster  ☐ Steel Channel
  ☐ Other  ☐ Handrail  ☐ Fence
  ☐ Does curb need repair ☐ Yes  ☑ No
  ☑ Curb repair  602  lin. ft.

* Existing median curb:
  ☐ Safety Barrier Curb  ☐ Curb/parapet  ☐ Blockout  ☐ Thrie Beam  ☐ Baluster  ☐ Steel Channel
  ☐ Other  ☐ Handrail  ☐ Fence
  ☐ Does curb need repair ☐ Yes  ☑ No
  ☑ Curb repair  lin. ft.

* Approach rail attachment:
  ☐ None  ☐ Not attached  ☐ 4 Hole  ☐ 5 Hole  ☐ Turn-down  ☐ Other

* If the existing handrails will be removed, does the local maintenance supervisor wish to keep them?  ☐ Yes  ☐ No

Storage address:

  location:

  address:

  city:  state:  zip:

* Notes:  Total of 1204 lin. ft. of concrete baluster bridge rail.
### EXPANSION DEVICES

<table>
<thead>
<tr>
<th>Bent</th>
<th>Type</th>
<th>Recommendations</th>
<th>Gap Left</th>
<th>Gap Right</th>
<th>Temperature &amp; Other Info</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

* Notes: N/A

### BEARINGS

<table>
<thead>
<tr>
<th>Bent</th>
<th>Coating</th>
<th>Recommendations</th>
<th>Notes (indicate which bearings at each bent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

* Notes: N/A

### COATING SYSTEM (PAINT)

* Existing coating system: N/A  green _gray_ other _other_  

* Date last coated: ___________  

* Coating recommendation:  
  - Yes (Overcoat is not an option)  
  - No  
  - Blast clean & recoat all steel  
  - Clean & overcoat all steel  
  - Blast clean & recoat only at joint locations  
  - Blast & recoat at joint locations and clean & overcoat all other steel  

Note: Pull off test required for overcoat (Calcium Sulfonate) option. Bridge Division will request pull off tests.

* Notes: N/A

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**Picture #**

**Picture # (Provide Pictures of Each Bearing)**

---

**Picture #**

---

Effective: 2013 June 4  
Supersedes: 2009 May 1
### SUPERSTRUCTURE REPAIRS

(Repairs needed not previously stated.)

**Concrete Slab Superstructure or Girder:**
(above the bearings)
(Example: Deck solid slabs, voided slabs, box girder, deck girders & prestressed girders)

**Steel:**
(Example: Beams, stringers, girders, diaphragms, cross-frames, misc. steel)

**Member**
(Check all that apply) (Attach pictures)

<table>
<thead>
<tr>
<th>Member</th>
<th>Section Loss</th>
<th>%</th>
<th>Cracks</th>
<th>in.</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**Notes:** The HDR field investigation report describes typical deterioration found. Further analysis has shown that areas that could be considered Superstructure will be encased behind new construction during a rehabilitation due to needed widening.

**Picture #** Pic: 005, 006

### SUBSTRUCTURE REPAIR

<table>
<thead>
<tr>
<th>Bent</th>
<th>Formed Repair</th>
<th>Unformed Repair</th>
<th>Seal Concrete Beam Cap Bts.</th>
<th>Coat Exposed Pile @ Int. Pile Cap Bts.</th>
<th>Describe (Beam, Backwall, Wing, etc.)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>110 sq. ft.</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>2</td>
<td>170 sq. ft.</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>3</td>
<td>130 sq. ft.</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>190 sq. ft.</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>140 sq. ft.</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>110 sq. ft.</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Does the structure need graffiti protection? ![ ] No  ![ ] Bottom 8' of Concrete  ![ ] End Bents  ![ ] Other

* Notes: ____________________________

**Picture #** Pic: 007, 008, 009
**SIGNS, SIGNALS & OR LIGHTING ATTACHED TO STRUCTURE**

- **Are there signs attached directly to this structure?**
  - Yes
  - No
  - Quantity: ______
  - Location: __________________________

- **Describe proposed work to be done to signs.**
  __________________________________________

- **Are there signals attached directly to this structure?**
  - Yes
  - No
  - Quantity: ______
  - Location: __________________________

- **Describe proposed work to be done to signals.**
  __________________________________________

- **Is there aviation lighting attached to this structure?**
  - Yes
  - No
  - N/A
  - Red: ______
  - Green: ______

- **Is there navigational lighting attached to this structure?**
  - Yes
  - No
  - N/A
  - Red: ______
  - Green: ______

- **Is there roadway lighting attached to this structure?**
  - Yes
  - No
  - N/A

- **Describe proposed work to be done to lighting.**
  __________________________________________

- **Notes:**
  __________________________________________

---

**UTILITIES ATTACHED TO STRUCTURE**

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Size</th>
<th>Owner</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit</td>
<td></td>
<td></td>
<td></td>
<td>Repaint</td>
</tr>
<tr>
<td>Pipeline</td>
<td></td>
<td></td>
<td></td>
<td>Repaint</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td>Repaint</td>
</tr>
</tbody>
</table>

- **Notes:** Utilities on adjacent ped bridge.

---

**Picture #**

**Effective:** 2013 June 4  
**Supersedes:** 2009 May 1
**CATHODIC PROTECTION SYSTEM**

* Is there a cathodic system on this structure?  
  ☐ Yes  ☐ No  ☐ Remove  ☐ Do not alter  ☐ Abandon in place (grooved system)

* Is it on and working?  
  ☐ Yes  ☐ No  ☐ Unknown

* Notes: __________________________________________

**CHANNEL ALIGNMENT, SLOPE PROTECTION & SCOUR**

* Is channel aligned to bridge opening?  
  ☐ Yes  ☐ No  Describe ____________________________

* Is drift a continual problem?  
  ☐ Yes  ☐ No  Describe & Locate High water drift on south bank affecting pier 4

* Is erosion a problem?  
  ☐ Yes  ☐ No  Describe & Locate Erosion around substructure units on South bank

* Describe slope protection in place.  
  Little of original slope protection in place around Abutment 6

* Scour  
<table>
<thead>
<tr>
<th>At Footing</th>
<th>At Piling</th>
<th>Depth</th>
<th>Bent</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>Ext 8'</td>
<td>4</td>
<td>See MoDOT UW Insp. Report Dated 07/26/2016</td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Describe needed work.  
  Remove drift up and down stream. Level elevation under bridge. Fill scour holes with type II rip rap

**TRAFFIC LANES**

* Number of lanes striped:  
  on structure 1  under structure 0

* Shoulder width:  
  ☐ None  on structure 4 ft (left) 4 ft (right)  under structure 0 ft (left) 0 ft (right)

* Sidewalk widths:  
  on structure 0 ft (left) 0 ft (right)  under structure 0 ft (left) 0 ft (right)

* Median width:  
  on structure 0  under structure 0

* Proposed improvements for lanes/shoulders/sidewalks: ____________________________________________

Picture #  Pic: 013
GENERAL AREA CONDITIONS

* Primary area: ☐ Commercial ☐ Industrial ☐ Residential ☐ Agricultural ☐ Military ☐ Other Nat Waterway Park

* Posted speed limit on structure: 35 mph

* Posted load on structure:
  - Single Unit: [ ] Yes [ ] No
  - Semi (tractor/trailer): [ ] Yes [ ] No

* Are both signs in place?

* Do pedestrians and/or bicyclists regularly use this structure?

* Notes: Posted at S-4. Ped bridge adjacent to structure. Posted as single lane centerline use only.

Picture # Pic: 014, 015

MAINTENANCE

* What work has been done to this structure that may not be reflected on existing bridge plans?

  Depth of roadway overlay surface along CL bridge

Picture #

ADDITIONAL FIELD NOTES

Picture #
STAGING / DETOUR

* Traffic Control: [ ] Close structure  [ ] Stage construction on structure  [ ] Cross over traffic to adjacent structure  [ ] Detour
  [ ] Other option  Build an offset alignment or staged construction on structure.

* Define probable detour route. Detour estimate at 55+ miles.

PERSONS ASSISTING WITH CHECKLIST

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Ph.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian Zeiger, PE</td>
<td>Senior Bridge Engineer, HDR Engineering</td>
<td>(913) 302 - 8931</td>
</tr>
<tr>
<td>Terry Stowell</td>
<td>CA Field Operations, Olsson Assoc.</td>
<td>(816) 604 - 9888</td>
</tr>
</tbody>
</table>

REQUIRED SIGNATURES

I have reviewed the information on this checklist and believe it to be as accurate as possible.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Project Manager</td>
<td></td>
<td></td>
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<tr>
<td>District Bridge Engineer</td>
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</tr>
</tbody>
</table>

The structural rehabilitation checklist indicates how the bridge is functioning and aging.

All deterioration should be noted, even if it is known that the work will not be completed under the proposed project.

Send NEW Structural Rehabilitation Checklist by email
To: "Bridge Survey Processor"
Cc: Structural Project Manager or Structural Resource Manager
Pic. 001: Typical view of pavement, north end shown.

Pic. 002: Typical leakage from sidewall joints
Route 19 over Current River, Br # G0804

Pic. 003: West barrier, Span (2-3)

Pic. 004: West barrier, Span (4-5)
Pic. 005: Spalling along corner of arch ring, Span (4-5) east face

Pic. 006: Spalling along corner of arch ring, Span (4-5) east face
Pic. 007: Cracking and delamination, Abutment 1 west side

Pic. 008: Spalled and deteriorated concrete, Pier 3 west face
Pic. 009: Spalling and delamination on pilaster, Pier 2 east side

Pic. 010: Utilities on adjacent pedestrian / utility crossing
Pic. 011: Scour hole at Pier 3

Pic. 012: Scour hole at Pier 4
Pic. 013: Roadway over bridge looking north

Pic. 014: Pedestrian / utility crossing east of highway, looking south
Pic. 015: Reduction to single lane with yield sign, south end of bridge
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Route 19 over Spring Valley (Br. J0420)
Rehabilitation / Replacement Concept Study
Report of Field Investigation

MoDOT Project No.: J9P3305

Prepared by:
HDR Engineering, Inc.

Site Work:
August 7, 2019
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The field investigation was performed August 7th, 2019 by a field crew consisting of Brian Zeiger, PE with HDR Engineering, Inc. and Terry Stowell with Olsson Associates. The bridge was accessed on foot from the north approach, via a local park access road under the south approach span, and from the south approach. No equipment was used for access. The bridge was open to traffic at all times for this field investigation.

As a condition of the overall scope of the project it was assumed that the bridge will need a new deck for all options and therefore the deck was excluded from the investigation. General photos of the deck and rail were included for information only.

Bridge Description

The bridge over Spring Valley (J0420) was built in 1930, is 523 feet long and has 7-52’ arch deck girder approach spans (3 on one end and 4 on the other) with a 155’ spandrel arch main span. The bridge has ratings of deck – 4, superstructure – 5 and substructure – 6, and has a 20’ roadway. The bridge is not posted. The deck is in poor condition. The bridge goes over and next to campgrounds, park service buildings, roads, springs, caves and trails.
Location Map

Aerial Photograph
Elevation of Bridge
(Bent, spandrel column and bracket numbering shown)
Route 19 over Current River (Br. G0804)
Rehabilitation / Replacement Concept Study
Report of Field Investigation

August, 2019
Typical Elevation of Intermediate Bent
Results of Field Investigation

Deck and Barrier
The scope of services for this project listed the project condition that the deck and barrier would be replaced under any of the rehabilitation scenarios developed for this project. The deck and barriers were therefore excluded from analysis during the site visit. However, a cursory observation was made for informational purposes. The following photographs show various areas of collision damage and deflection of the rails, the spalling of the asphalt wearing surface of the roadway, heavy deterioration at the deck drains, and overall views of the wearing surface and deck expansion joints.

Collision Damage to the Railing
Condition of Wearing Surface

Heavy Deterioration of the Deck at Existing Drains
Superstructure

The superstructure of the bridge consists of three units. Unit 1 is three spans of concrete girders with floorbeams, Unit 2 is an open spandrel arch span and Unit 3 is four spans of concrete girders with floorbeams. The arch span includes multiple spandrel bents composed of columns, cap beams and overhang brackets. Refer back to the typical sections for views of these details.

In general the concrete girders of Units 1 and 3 and the arch ribs of Unit 2 are in good condition with areas of spalling, hairline cracking, delamination and staining, primarily from drainage from the deck. The brackets supporting the deck cantilevers are deteriorated throughout the structure.

The arch spandrel columns and cap beams exhibit several areas of spalling, cracking and delamination. Additionally there is some drift caught up on the west arch rib at the north end of the span indicating inundation of this area during a high flow event. There is also spalling with exposed rebar on several locations of the arch lateral bracing.

The bridge is on a 45 degree skew and is exhibiting lateral movement of the girders relative to the substructure due to the sharp skew. Previous retrofit projects have included the installation of brackets to keep the girders in line with the bearings. The girders are tight against these brackets. At Bent 9 there appears to have been an attempt to raise the east girder and realign the upper bearing plate with the girder. A jacking block had been added to the girder to facilitate this modification.

The following photographs represent examples of these superstructure observations.
Typical Hairline Cracks in Girders

Typical Delamination on Girders
Typical Deterioration of Brackets

Typical Girder Restraint Bracket
East Girder at Bent 9

Deterioration of Floorbeams at Intermediate Bents
Spalling and Delamination of Arch Ribs

Drift in Structure
Typical Deterioration on Spandrel Columns

Typical Deterioration on Spandrel Capbeams
Substructure
The substructure elements are in generally fair condition. There are areas of scaling, staining, and deterioration on most substructure members. No obvious signs of settlement were observed. The abutments generally exhibit the spalling cracking and delamination on the backwalls and wings. The intermediate bents have numerous areas of cracking with spalling and exposed reinforcing steel. The following photographs highlight the typical deterioration of the substructure elements.
Deterioration of Intermediate Bent Columns

Deterioration of Intermediate Bent Cap Beams
Summary
The bridge is in generally fair condition with consistent areas of deterioration throughout the elements. Most of this deterioration is due to drainage from the open curb drains of the deck allowing drainage to fall on the superstructure and substructure members.

Recommendations
Based on the observations of this site visit, rehabilitation of this structure should include the following items:

- Replacement of the deck, barrier and the wearing surface. Replacement of the deck will require replacement of the concrete deck girders and possibly the floorbeams over the spandrel arch.
- Include a drainage system in the rehabilitation or replacement.
- Repair or replace of the numerous deteriorated brackets.
- Repair the numerous areas of cracking, spalling and delamination in the superstructure and substructure.
- Concrete repair and possible chloride remediation at deteriorated concrete areas and areas of high chloride levels.
- Stabilization of the lateral displacement of the girders due to the 45 degree skew.
- Fill observed scour hole and provide protection for the pier.
**OVERLAY**

- **Type of existing overlay:**
  - [ ] None
  - [✓] Asphalt
  - [ ] Low Slump
  - [ ] Silica Fume
  - [ ] Latex
  - [ ] Epoxy
  - [ ] Other: 

- **Existing overlay thickness:** 1" *

- **Year overlay was applied:** 2010 [ ] Unknown

- **% of overlay repaired or patched:** 

- **Replace overlay:** [ ] Yes [ ] No

- **Notes:** Deck replacement incorporated into rehab

**DECK REPAIRS**

(Deck repair quantities are required even if a Deck Test request has been ordered for this structure.)

- **Half-sole repairs:** 
  - (round up to the nearest 50 sq. ft.) 
  - [ ] Yes [ ] No

- **Full-depth repairs:** 
  - (round up to the nearest 25 sq. ft.) 

- **Slab edge repairs:** 
  - (covers the outer 4" of the slab edge) 
  - [ ] Yes [ ] No

- **Superstructure repair (Unformed):** 
  - (covers the remaining slab cantilever beyond the outer 4") 

- **Clean & seal slab edge:** 
  - (in lieu of edge repairs) 
  - [ ] Yes [ ] No

- **Cantilever replacement:** 
  - [ ] Yes [ ] No

- **Total surface hydro demolition bridge deck:** 
  - (half-sole and full depth repair quantities still required) 
  - [ ] Visual [ ] Bridge Inspection Report [ ] Sounded [ ] Other

- **Deck repairs with voided tube replacement:** 
  - (if applicable) 
  - [ ] Yes [ ] No

- **How were the quantities obtained?** 
  - [ ] Visual [ ] Bridge Inspection Report [ ] Sounded [ ] Other

- **Notes:** Deck replacement incorporated into rehab
DECK REPAIRS CONT.

* ISSUES \ PROBLEMS WITH PRECAST PRESTRESSED DECK PANELS

<table>
<thead>
<tr>
<th>Spans</th>
<th>At Panel Jt.</th>
<th>Btwn (mid) Panel Jt.</th>
<th>Location in Span</th>
<th>Deterioration</th>
<th>Describe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Location in Span</td>
<td>Type</td>
<td>Amount sq. ft.</td>
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<td>sq. ft.</td>
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</tbody>
</table>

* Notes: N/A

(Deterioration may include water saturation, efflorescence, rust staining, cracking, spalling, exposed steel, disintegration of panel edges at joints, etc. Typically observed at or near panel joints. The location and "Type" of deterioration should be recorded.)

3

APPROACH SLABS

* Is there a bridge approach slab in place? □ Yes ✔ No * Type: □ Concrete □ Asphalt □ Other

* Is there a rdwy. approach pavement in place? □ Yes ✔ No * Type: □ Concrete ✔ Asphalt □ Other

* Is the approach slab sinking at the end bent? □ N/A ✔ Yes No

* Are repairs needed to the bridge approach slab driving surface? □ Yes ✔ No

(Typically a roadway item but will be reported to district on the Bridge Memorandum.)

* Notes:

Picture #
SLAB DRAINS

* Is the drainage system working adequately? ☐ Yes ☑ No

* Recommendations: Provide drains during rehabilitation or replacement of existing bridge.

* Notes:

________________________________________

CURBS & RAILS

* Existing curb (left side):

☐ Safety Barrier Curb ☐ Curb/parapet ☐ Blockouts ☐ Thrie Beam ☐ Baluster ☐ Steel Channel

☐ Other ☐ Handrail ☐ Fence

☐ Does curb need repair ☑ Yes ☐ No

☐ Curb repair ________ lin. ft.

☐ Remove hand rail ☐ Yes ☐ No

☐ Add curb blockout ☐ Yes ☐ No

* Existing curb (right side):

☐ Safety Barrier Curb ☐ Curb/parapet ☐ Blockouts ☐ Thrie Beam ☐ Baluster ☐ Steel Channel

☐ Other ☐ Handrail ☐ Fence

☐ Does curb need repair ☑ Yes ☐ No

☐ Curb repair ________ lin. ft.

☐ Remove hand rail ☐ Yes ☐ No

☐ Add curb blockout ☐ Yes ☐ No

* Existing median curb: Type: N/A Width _____ “ Height _____ ”

☐ Does curb need repair ☐ Yes ☐ No

☐ Curb repair ________ lin. ft.

* Approach rail attachment: ☑ None ☐ Not attached ☐ 4 Hole ☐ 5 Hole ☐ Turn-down ☐ Other

* If the existing handrails will be removed, does the local maintenance supervisor wish to keep them? ☐ Yes ☑ No

Storage address: location:

address:

city: state: zip:

* Notes: Barrier replacement incorporated into rehab

________________________________________

Picture # Pic: 002

Picture # Pic: 003
## Expansion Devices

<table>
<thead>
<tr>
<th>Bent</th>
<th>Type</th>
<th>Recommendations</th>
<th>Gap Left</th>
<th>Gap Right</th>
<th>Temperature &amp; Other Info</th>
</tr>
</thead>
<tbody>
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* Notes: Expansion gaps have been overlaid with asphalt

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## Bearings

<table>
<thead>
<tr>
<th>Bent</th>
<th>Coating</th>
<th>Recommendations</th>
<th>Notes (indicate which bearings at each bent)</th>
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</thead>
<tbody>
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<td>USE-IN-PLACE</td>
<td>REPAIR</td>
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<td></td>
<td>USE-IN-PLACE</td>
<td>REPLACE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BLAST</td>
<td>CLEAN &amp; RECOAT</td>
<td>MAKE END BENT SLIDING SLAB</td>
</tr>
<tr>
<td></td>
<td>BLAST</td>
<td>CLEAN &amp; RECOAT</td>
<td>MAKE END BENT INTEGRAL</td>
</tr>
</tbody>
</table>

* Notes: N/A

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## Coating System (Paint)

* Existing coating system: N/A  □ green □ gray □ other □

* Date last coated:    □ Yes (Overcoat is not an option)  □ No

* Coating recommendation:

  □ Blast clean & recoat all steel  □ Clean & overcoat all steel

  □ Blast clean & recoat only at joint locations □ Blast & recoat at joint locations and clean & overcoat all other steel

Note: Pull off test required for overcoat (Calcium Sulfonate) option. Bridge Division will request pull off tests.

* Notes: N/A

---

**Picture # Pic: 001**
SUPERSTRUCTURE REPAIRS  (Repairs needed not previously stated.)

Concrete Slab Superstructure or Girder:  (above the bearings)
(Example: Deck solid slabs, voided slabs, box girder, deck girders & prestressed girders)

Steel:  (Example: Beams, stringers, girders, diaphragms, cross-frames, misc. steel)
Member  (Check all that apply) (Attach pictures)  Describe & Locate

<table>
<thead>
<tr>
<th></th>
<th>Section Loss</th>
<th>%</th>
<th>Cracks</th>
<th>in.</th>
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<tbody>
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Member  (Check all that apply) (Attach pictures)  Describe & Locate

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<th>Section Loss</th>
<th>%</th>
<th>Cracks</th>
<th>in.</th>
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</table>

Notes: The HDR field investigation report describes typical deterioration found. Further analysis has shown that a widening and rehabilitation will need to replace the superstructure.

Picture #  Pic: 004, 005, 006, 007, 008, 009

SUBSTRUCTURE REPAIR

<table>
<thead>
<tr>
<th>Bent</th>
<th>Formed Repair</th>
<th>Unformed Repair</th>
<th>Seal Concrete Beam Cap Bts.</th>
<th>Coat Exposed Pile @ Int. Pile Cap Bts.</th>
<th>Describe (Beam, Backwall, Wing, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

* Does the structure need graffiti protection?  □ No  □ Bottom 8' of Concrete  □ End Bents  □ Other  

* Notes: The HDR field investigation report describes typical deterioration found. A rehabilitation will replace all substructure except the arch footings.

Picture #  Pic: 010, 011
**SIGN, SIGNALS & OR LIGHTING ATTACHED TO STRUCTURE**

- Are there signs attached directly to this structure? [ ] Yes [ ] No
  - Quantity: [ ]
  - Location: [ ]

- Describe proposed work to be done to signs.

- Are there signals attached directly to this structure? [ ] Yes [ ] No
  - Quantity: [ ]
  - Location: [ ]

- Describe proposed work to be done to signals.

- Is there aviation lighting attached to this structure? [ ] Yes [ ] No
  - Red [ ]
  - Green [ ]
  - Quantity: [ ]

- Is there navigational lighting attached to this structure? [ ] Yes [ ] No
  - Red [ ]
  - Green [ ]
  - Quantity: [ ]

- Is there roadway lighting attached to this structure? [ ] Yes [ ] No
  - Quantity: [ ]

- Describe proposed work to be done to lighting.

- Notes:

**UTILITIES ATTACHED TO STRUCTURE**

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Size</th>
<th>Owner</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit</td>
<td></td>
<td></td>
<td></td>
<td>Repaint</td>
</tr>
<tr>
<td>Conduit</td>
<td></td>
<td></td>
<td></td>
<td>Repaint</td>
</tr>
<tr>
<td>Conduit</td>
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<td></td>
<td></td>
<td>Repaint</td>
</tr>
<tr>
<td>Conduit</td>
<td></td>
<td></td>
<td></td>
<td>Repaint</td>
</tr>
</tbody>
</table>

- Notes: None
CATHODIC PROTECTION SYSTEM

* Is there a cathodic system on this structure?  [ ] Yes  [ ] No  [ ] Remove  [ ] Do not alter  [ ] Abandon in place (grooved system)

* Is it on and working?  [ ] Yes  [ ] No  [ ] Unknown

* Notes:

________________________________________________________________________

________________________________________________________________________

Picture #

CHANNEL ALIGNMENT, SLOPE PROTECTION & SCOUR

* Is channel aligned to bridge opening?  [ ] Yes  [ ] No  Describe

________________________________________________________________________

* Is drift a continual problem?  [ ] Yes  [ ] No  Describe & Locate  High water drift on pier 4

________________________________________________________________________

* Is erosion a problem?  [ ] Yes  [ ] No  Describe & Locate  Erosion under substructure tie beams on units 1 and 9.

* Describe slope protection in place.  Missing heavy stone on banks under bridge

* Scour

<table>
<thead>
<tr>
<th>Bent</th>
<th>At Footing</th>
<th>At Piling</th>
<th>Depth</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ext 3’</td>
<td>4</td>
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<td>5</td>
</tr>
</tbody>
</table>

* Describe needed work.  Stabilize scour holes at Pier 4 with type II rip rap

________________________________________________________________________

________________________________________________________________________

Picture #  Pic: 012

TRAFFIC LANES

* Number of lanes striped:

<table>
<thead>
<tr>
<th>on structure</th>
<th>under structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

* Shoulder width:  [ ] None

<table>
<thead>
<tr>
<th>on structure</th>
<th>under structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft (left)</td>
<td>0 ft (right)</td>
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</tbody>
</table>

* Sidewalk widths:

<table>
<thead>
<tr>
<th>on structure</th>
<th>under structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft (left)</td>
<td>0 ft (right)</td>
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</table>

* Median width:

<table>
<thead>
<tr>
<th>on structure</th>
<th>under structure</th>
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<tbody>
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<td>0</td>
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</table>

* Proposed improvements for lanes/shoulders/sidewalks:

________________________________________________________________________
GENERAL AREA CONDITIONS

* Primary area: [ ] Commercial [ ] Industrial [ ] Residential [ ] Agricultural [ ] Military [ ] Other [ ] Nat Waterway Park

* Posted speed limit on structure: 35 mph

* Posted load on structure: ______ tons @ ______ mph [ ] NA
  Single Unit: ______ tons @ ______ mph [ ] NA
  Semi (tractor/trailer): ______ tons @ ______ mph [ ] NA

* Are both signs in place? [ ] Yes [ ] No

* Do pedestrians and/or bicyclists regularly use this structure? [ ] Yes [ ] No [ ] Undetermined

* Notes:

MAINTENANCE

* What work has been done to this structure that may not be reflected on existing bridge plans?

ADDITIONAL FIELD NOTES
STAGING / DETOUR

* Traffic Control: 
  - Close structure
  - Stage construction on structure
  - Cross over traffic to adjacent structure
  - Detour
  - Other option Build an offset alignment or use temporary bridge.

* Define probable detour route. Detour estimate at 55+ miles.

PERSONS ASSISTING WITH CHECKLIST

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Ph.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian Zeiger, PE</td>
<td>Senior Bridge Engineer, HDR Engineering</td>
<td>(913) 302 - 8931</td>
</tr>
<tr>
<td>Terry Stowell</td>
<td>CA Field Operations, Olsson Assoc.</td>
<td>(816) 604 - 9888</td>
</tr>
</tbody>
</table>

REQUIRED SIGNATURES

I have reviewed the information on this checklist and believe it to be as accurate as possible.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
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<tbody>
<tr>
<td>Transportation Project Manager</td>
<td></td>
</tr>
<tr>
<td>District Bridge Engineer</td>
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</tbody>
</table>

The structural rehabilitation checklist indicates how the bridge is functioning and aging.

All deterioration should be noted, even if it is known that the work will not be completed under the proposed project.

Send NEW Structural Rehabilitation Checklist by email
To: "Bridge Survey Processor"
Cc: Structural Project Manager or Structural Resource Manager
Pic. 001: Typical view of surface over bridge deck

Pic. 002: Typical deck condition below curb openings
Route 19 over Spring Valley, Br # J0420

Pic. 003: Bridge barrier rail with misalignment

Pic. 004: Hairline cracks in girder, Span J1-2) west girder shown
Route 19 over Spring Valley, Br # J0420

Pic. 005: Deterioration of cap beam cantilever

Pic. 006: Typical deterioration of spandrel capbeams
Pic. 007: Spalling near center of arch rib, east rib

Pic. 008: Spalling of arch rib, west rib near south thrust block
Pic. 009: Typical deterioration of spandrel column

Pic. 010: Vertical cracking in column, Bent 3 shown
Pic. 011: Spalling and cracking on column, Bent 6 shown

Pic. 012: Scour hole at Pier 4
Pic. 013: Roadway over bridge looking north