Troy Bridge
August 2021

Troy Bridge Inspection

Troy Bridge over NE Stadium Way

Inspection Date: August 6, 2021

Weather: Sunny, 85F

Inspectors: Grant Buckingham P.E., Chuck Euwema P.E.

Prepared for: Washington State University

Prepared By: DCI Engineers

DCI Engineers

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1.0 Introduction

The Troy Bridge was inspected on August 6, 2021 by DCI Engineers for Washington State University. The point of contact for this inspection was Phil Johnson of WSU. The Troy bridge consists of 4 spans with lengths between 24 ft and 90 ft. Each span consists of two reinforced concrete girders connected by a reinforced concrete deck. There is a reinforced concrete abutment on both the north and south sides of the structure and one reinforced concrete pier and pier cap between each span; at the pier 2 location, an additional pier exists to support the stairs. One set of access stairs are located on the west side of pier 2. Inspectors used plans for the Troy bridge dated December 16, 1971 for reference. The bridge was stationed from south to north ordering piers 1-3 with girders 1 and 2 from west to east. Pier 2 is ordered 2A for the bridge and 2B for the stairs.

The purpose of the bridge inspection was to identify the condition and structural deficiencies for all areas. The main area of concern was concentrated at the Pier 2 location where spalled and delaminated areas on the pier, pier cap, girders and stair could be seen from the pedestrian sidewalk below. The inspection was conducted above and below the bridge. Due to the height of the bridge deck, the inspection was conducted from a moveable man lift for the underdeck and all elements directly under the deck. The girders, piers, pier caps, and stair end girders were painted which limited visual inspection of defects that may have been covered. All areas of the bridge were able to be inspected either visually or hands on. The reinforced concrete girders on the east and west sides of the bridge extend above and below the deck. For this inspection, the girder portion above the deck is considered part of the curb element. Many of the delaminated areas on the piers and pier caps that were located directly above pedestrian walkways were removed by the inspector for safety to the public from falling debris and to have a better visual inspection of subsurface defects behind the delamination.

2.0 Ratings

The overall bridge rating is evaluated in accordance with the NBI & AASHTO Bridge Ratings below. This is the first bridge inspection for this structure so there are no previous ratings. All ratings, observations and deficiencies noted are evaluated for the bridge at time of inspection. Any items that may have been changed after inspector left site are not reflected in this report. For all ratings see the Inspections Summary and Findings section for detailed information and photos on each element.

Bridge Element	NBI Rating
Deck (Reinforced Concrete)	5-Fair Condition
Superstructure (Reinforced Concrete Girders)	3-Serious Condition
Substructure (Reinforced Concrete Abutment, Piers, Pier Caps)	3-Serious Condition
Bearings (Steel Plates with Neoprene Pads)	4-Poor Condition
Bridge Rail and Curb (Metal Bridge Rail, Concrete Curb)	Rail-7-Good Condition Curb-6-Satisfactory Condition
Joints (Expansion Joint)	4-Poor Condition
Stair Structure (Reinforced Concrete Treads and Risers, Pier, Pier Cap, Reinforced Concrete Stringers)	4-Poor Condition

Code	Description
N	NOT APPLICABLE
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION - no problems noted.
7	GOOD CONDITION - some minor problems.
6	SATISFACTORY CONDITION - structural elements show some minor deterioration.
5	FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spalling, or scour.
4	POOR CONDITION - advanced section loss, deterioration, spalling, or scour.
3	SERIOUS CONDITION - loss of section, deterioration, spalling, or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	"IMMINENT" FAILURE CONDITION - major deterioration or section loss present in critical structural components, or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put bridge back in light service.
0	FAILED CONDITION - out of service; beyond corrective action.

3.0 Load rating

No load rating was performed for the Troy Bridge. If WSU determines that a load rating is needed or wanted, additional measurement and further investigation may be required.

4.0 Inspection Summary and Findings

4.1 Deck

The reinforced concrete deck consists of a single cast-in-place deck for each span. The deck is cast into the adjacent reinforced concrete girders to the east and west by means of a 1.5-in. keyway and reinforcing bar as shown in bridge plans. The deck has an electric snow melt grid throughout each span with junction boxes on the top of the deck and utility lines projecting out from the under deck at the pier caps. The deck slopes from north to south and there are no deck drains.

Overall, the deck was in **Fair Condition**.

- The top of deck exhibited minor scaling up to 1/16 to 1/8-in. deep throughout. (See Photo 12)
- The top of deck around the snow melt junction boxes exhibited hairline to 1/16-in.-wide cracks. Some areas had minor corrosion staining through the cracks. (See Photo 13)
- The top of deck exhibited transverse hairline to 1/16-in.-wide cracking with up to 1/8-in. edge spalling approximately every 3-5 ft throughout each span. Longitudinal hairline to 1/16-in.-wide cracks with minor edge spalling was present near deck joints and throughout top of deck for all spans. (See Photos 14-16)
- The underdeck exhibited transverse hairline to 1/16-in.-wide cracks with light to moderate efflorescence approximately every 2-4ft throughout each span. Longitudinal 1/16-in.-wide cracks were present at the deck joints with moderate to heavy efflorescence and corrosion staining. (See Photos 17-20)
- The underdeck at pier 2 had longitudinal 1/16-in.-wide cracking propagating from the bridge joint up to 20 ft in length with moderate to heavy efflorescence and areas of delamination at the north end of span 2. The south end of span 3 underdeck had a spall near the southwest corner measuring 8-in. wide by 10-in. long by 1-in. deep with exposed reinforcing. (See Photos 21-23)
- There were no deck drains in the deck.
- The top of deck was sounded and no areas of delamination were found.

See Photos 12-23 for Deck in the Photo Log.

4.2 Superstructure

The superstructure consists of two reinforced concrete girders at each span, one west of the deck (G1) and one east of the deck (G2). The girders extend above and below the deck and are tied into the deck with reinforcing bar as shown in bridge plans. Girders are not continuous across the piers and consist of 4 spans ordered from Span 1 to Span 4 from south to north. According to the bridge plans, span 1, 2 and 3 are pre-stressed and precast concrete; Span 4 was precast but not pre-stressed. Each of the girder ends are attached to either the pier caps or abutments with steel brackets and connection hardware. The bridge slopes from north to south. Most of the defects were observed near the ends of the girders where moisture is most concentrated from the joints above.

Overall, the Superstructure was in **Serious Condition** due to the shear cracks in the girders extending from the dapped girder end.

- The west girder in all spans had patches on the west face throughout, concentrated on the top edges of the west face. Most patches were delaminated and unsound. (See Photos 24 and 25)
- All girders were connected to the pier cap or abutments with steel brackets and embedded bolts. Over the pier caps the steel brackets were continuous on both interior faces with slotted holes on one side of the bracket to allow movement. Over the abutments the steel brackets were on both interior faces. The north abutment steel brackets slotted holes were vertical and not horizontal. The south abutment steel brackets did not have slotted holes. The connection hardware had moderate to heavy corrosion in all locations. See span 2, north end for more connection hard wear defects. (See Photos 34-36)
- Span 1:
    - South End
        - Girders in good condition.
    - North End
        - Both interior faces exhibited multiple hairline diagonal cracks extending from the dapped girder end up to 30-in. long on the east girder and 28-in. long on the west girder. Areas of delamination exist around the interior girder-to-pier cap hardware connection measuring up to 12-in. high by 14-in. long. (See Photos 26 and 27)
        - East face of the east girder had a spall in the top corner measuring 8-in. high by 8-in. long by 1-in. deep with no exposed bar. The bottom

edge just above the bearing pad exhibited a spall 3-in. high by 14-in. long by 1-in. deep with no exposed bar. (See Photos 28 and 29)

- West face of the west girder had a spall above the bearing plate measuring 14-in. high by 15-in. long by 1-in. deep with 3 exposed bars. (See Photo 30)

- Span 2:
  - South End
    - Both interior faces exhibited multiple hairline diagonal cracks extending from the dapped girder end up to 8-in. long on the east girder and 19-in. long on the west girder. (See Photos 31 and 32)
    - The west face of the west girder had a full height spall up to 4-in. wide by 1-in. deep with no exposed bar. (See Photo 33)
  - North End
    - Both interior faces exhibited multiple hairline diagonal cracks extending from the dapped girder end up to 36-in. long on the east girder and 16-in. long on the west girder. (See Photos 37 and 38)
    - The east girder had a spall at the northeast corner and above the bearing plate measuring 21-in. high by 16-in. long by 1.5 in. deep with 4 exposed bars having approximately 20% loss of section. (See Photos 39 and 40)
    - The west face of the west girder had a spall measuring 16-in. high by 15-in. wide by 1.5-in. deep with 2 exposed bars. (See Photo 41)
    - The steel connection hardware on top of Pier 2 for span 2 to span 3 girders had 2 sheared off bolts at the span 2 connection. (See Photos 42 and 43)

- Span 3:
  - South End
    - Both interior faces exhibited multiple hairline diagonal cracks extending from the dapped girder end up to 25-in. long on the east girder and 24-in. long on the west girder with rust staining. (See Photos 44 and 45)

- The east girder had spalls along the south face measuring 10-in. high by 6-in. wide by 1-in. deep with multiple reinforcing bar ends exposed. (See Photo 46)

- North End
  - The interior face of the east girder exhibited one hairline diagonal cracks extending from the dapped girder end up to 34-in. long. (See Photo 47)

- Span 4:
  - South End
    - The east girder had a spall on the east face above the bearing plate measuring 2-in. high by 12-in. long by 1-in. deep with no bar exposed. (See Photo 48)
    - The west girder had a spall on the west face at the bottom corner measuring 4-in. high by 10-in. long by 1-in. deep with no exposed bar. (See Photo 49)
  - North End
    - Both exterior faces on east and west girders had spalls above the bearing plates measuring up to 2-in. high by 14-in. long by 1-in. deep with no bar exposed. (See Photo 50)

See Photos 24-50 for Superstructure in the Photo Log. The yellow lines in the photos show areas of delamination and cracking.

4.3 Substructure

The substructure consisted of two reinforced concrete abutments on the north and south ends of the structure with one reinforced concrete pier and pier cap between each span. At the Pier 2 location there were 2 piers, one for the bridge (2A) and the other for the stairs (2B). See Stair Structure section for Pier 2B details. The bridge was stationed from south to north ordering Piers 1-3. Both abutments were accessible from 3 sides. The back sides of both abutments were enclosed by retaining walls and assumed to be backfilled. Due to the slope of the bridge all moisture migrates from north to south. Since there were no deck drains all moisture flows through the deck joints to the elements below. The worst defects were located at Pier 2 and Pier 3. The electric snow melt system was only observed to be tied into the Pier 1 cap.

Overall, the Substructure was in **Serious Condition** due to the large areas of delamination and cracking along the top corners of the pier caps and full circumference delamination with cracking at the top of Pier 2.

- South Abutment:
  - The west face exhibits minor hairline cracks with light efflorescence up to 5 ft long. (See Photo 51)
  - The abutment back wall exhibited random vertical hairline cracks.
- Pier 1:
  - Pier
    - The base of the pier had random minor areas of impact damage consisting of 2-in. diameter spalls in the corners.
  - Pier Cap
    - The top half of both south and north faces were delaminated and cracking for the whole length by up to 22-in. high on the vertical face and up to 8-in. on the top surface. (See Photos 52-54)
    - The south face had spalls at each top corner measuring 9-in. high by 20-in. long by 5-in. deep on the west corner and 15-in. high by 24-in. long by 4-in. deep on the east corner. The spalls appear to be caused by heavily corroded steel conduit from the electric snow melt system with areas of 100% section loss exposing wires. (See Photos 55-57)
    - The north face had a spall at the top west corner measuring 5-in. high by 12-in. long by 3-in. deep. (See Photo 58)
- Pier 2:
  - Pier
    - The top of the pier was delaminated on each face. Measurements of the crack height were taken at each corner: 60-in. at the southwest corner, 32-in. at the northwest corner, 16-in. at the northeast corner and 48-in. at the southeast corner. Cracks propagated down each corner for the length of the delamination up to 1/2-in. wide at the southwest corner. (See Photos 59 and 60)
    - The southwest, northwest, and northeast top corners all had spalls with exposed corroded steel measuring up to 15-in. high by 8-in. wide by 2.5-in. deep at the southwest, 13-in. high by 8-in. wide by 2.5-in.

deep at the northwest, and 14-in. high by 5-in. wide by 2-in. deep at the northeast. (See Photos 61-63)

- Pier Cap
  - The east face of exhibits spalls and scaling throughout up to 1-in. deep with one large spall below the bearing measuring 7-in. high by 17-in. wide by 1.5-in. deep with the steel bearing pad exposed. (See Photo 64)
  - The top half of the north face had an area of delamination with cracking up to 5 ft long by 8-in. high with rust staining. (See Photo 65)
  - The north, south and bottom faces had large areas of spall, delamination, and scaling throughout up to 1.5-in. deep with exposed bar. (See Photos 66-68)

- Pier 3:
  - Pier
    - In good condition
  - Pier Cap
    - The top corners of both south and north faces were delaminated and cracking measuring 15-in. high by 5.5 ft long by 4-in. wide on the top surface for the north face and 13-in. high by 40-in. long by 4-in. wide in the top surface for the south face. (See Photos 69 and 70)
    - The east face had a spall at the bearing plate measuring 6-in. high by full width of the cap by 1/2-in. deep with exposed steel bearing plate having moderate surface corrosion. (See Photo 71)

- North Abutment:
  - The north abutment was overall in good condition with minor debris on the beam seat ledge and moisture staining from the approach joint above. A concrete core was visible in the middle of the south face.

See Photos 51-71 for Substructure in the Photo Log. The yellow lines in the photos show areas of delamination.

4.4 Bearings

The bearings at the ends of each girder mainly consisted of two steel plates with a thin neoprene pad between the bearing surfaces. Under the lower steel plate was a grout pad and a large steel bearing pad embedded in the pier cap. Many of the large steel bearing pads were exposed due to spalls in the pier caps. See Stair Structure section for stair bearings.

Overall, the Bearings were in **Poor Condition**.

- All visible neoprene pads were cracked, bulging, and dried out. (See Photos 72-76)
- All steel plates had light to heavy surface corrosion with areas of 1/8-in. pack rust and 1/16-in. flaking mainly at Pier 1 and Pier 2. (See Photos 72-76)
- It is evident that the bearings are not fully working as intended due to the concrete spalls around the bearings shown in the Superstructure and Substructure sections.

See Photos 72-76 for Bearings in the Photo Log.

4.5 Bridge Rail and Curb

The bridge rails consisted of 2 metal rails, one on the east and one on the west, running the full length of each bridge span. The metal rails are connected directly into the top of each curb. Both rails are sound and in good condition. For this inspection, the girder portion above the deck is also considered part of the curb element. The curbs are reinforced concrete and run the full length of each bridge span. The stairs rails and curbs are included in this section.

Overall, the Bridge Rail was in **Good Condition** and the Curb was in **Satisfactory Condition.**

- Both bridge rails exhibit minor surface corrosion at the connection point to the tops of the curbs and minor areas of impact damage resulting in areas of chipped paint. (See Photos 77-79)
- The curbs exhibited random areas of spalling along the top interior edges throughout up to 1/2-in. deep and areas up to 4 ft long. (See Photos 80-82)

See photos 77-82 for Bridge Rails and Curb in the Photo Log.

4.6 Joints

The expansion joints consist of a Acmaseal No. 743 or similar as shown in the bridge plans. It is evident from the excessive deterioration below each joint that the seals are not functioning as intended. Since there are no drains on the bridge the water seeps through the joints to the elements below.

Overall, the Joints were in **Poor Condition**.

- The majority of the joint material had deteriorated and had lack of adhesion with the adjacent concrete surfaces. (See Photos 83 and 84)
- The joint exhibits minor amounts of debris impaction along the top edge. (See Photos 83 and 84)
- From the corrosion and deterioration of the elements below the joints, it is evident that the joints leak and are no longer sealed.

See photos 83 and 84 for Joint in the Photo Log.

4.7 Stair Structure

The stairs are located on the west side of the bridge at Pier 2 and access NE College Ave. and the top of bridge deck. The top of the stairs are in line with Pier 2 (2A) and have a standalone pier (2B) with pier cap. The stair structure is separated from the bridge by an expansion joint. The stairs consist of reinforced concrete treads, risers, underdeck, stringers, girders, and curb. At the top of the stairs the stringers transfer into girders that are on the west, south and east sides of the top landing. The metal rail on both sides of the stairs and top landing are tied directly into the top of the curb. For this inspection, the portion of the stringers and girders that rise above the stair treads and top landing are considered the curb. The bridge plans show that under the stair treads are electric snow melt grids. Bearings are located between the girders and pier cap at the east and west sides.

Overall, the Stair Structure was in **Poor Condition**.

- The treads and risers exhibit longitudinal and transverse 1/16-in. cracks throughout that also propagate into both landings. (See Photos 85 and 86)
- The majority of the steps had transverse cracks on the riser face approximately 2-in. to 3-in. below the tread with heavy leakage accumulation. The heaviest areas were located on the bottom two stairs. (See Photos 87 and 88)
- The under deck had hairline to 1/16-in. cracks with moderate to heavy rust staining and efflorescence throughout. (See Photos 89 and 90)

- The stringers exhibited hairline cracks spaced approximately every 1-2ft throughout with rust staining. Delamination and impending spalls were observed in random locations throughout. The previously noted failed reinforcing bar in the TD&H report dated July 15, 2021 was observed to be a shallow reinforcing bar that was not properly tied in place, had low concrete cover, and had corroded, causing the concrete in this localized area to spall.
- Pier 2B had an area of delamination located on the pier at the top northwest corner measuring 16-in. high by approximately 8-in. wide. (See Photo 91)
- Pier Cap
    - The top corners of both south and north faces were delaminated and cracking measuring 16-in. high by 4.5 ft long for the north face and 6-in. high by 4 ft long with up to 1/4-in.-wide cracking for the south face. (See Photos 92 and 93)
    - The underside at the east end had a spall measuring 6-in. wide by 13-in. long by 2-in. deep with 2 exposed bars. (See Photo 93)
    - Small areas of spall up to 6-in. diameter with 1-in. penetration were observed in random locations.
- The girders around the top landing exhibited two large spalls measuring 29-in. long by 11-in. wide by 1-in. deep with 4 exposed bars at the north bottom edge of the south girder and 12-in. long by 5-in. wide by 1.5-in. deep with 2 exposed bars at the southeast bottom corner of the south girder. (See Photos 95 and 96)
- The bearings between the girders and pier cap at the east and west sides had 1/8-in. to 1/4-in. pack rust in the steel plates. (See Photos 97 and 98)

5.0 Assessment and Recommendations

The above report summarizes our inspection of the Troy Bridge located on the Washington State University Campus. The main area of concern was concentrated at the Pier 2 location where spalled and delaminated areas on the pier, pier cap, girders and stair access could be seen from the pedestrian sidewalk below. No load rating was performed on the Troy Bridge. If determined that a load rating is needed or wanted, additional measurement and further investigation may be required.

Overall, the bridge is in Fair to Serious condition except for the curb and rails. It is evident that the bridge has reached a time in its life span where main structural elements are moving into advanced deterioration. Due to the deteriorated expansion joints and the lack of deck drains, moisture is funneled through the deck joints. As moisture is concentrated at the elements below the joints, the bridge over time in these areas has seen an increased rate of deterioration. It is uncertain how deteriorated the electric snow melt system is or how much moisture has been able to infiltrate the structure below the deck wearing surface, but during the inspection DCI was informed that the electric snow melt system is no longer operational, and inspectors observed exposed wired at Pier 1. (See Substructure section for details) Although the Pier 2 location was of main concern it is evident all areas of the bridge structure have major defects, except the North and South Abutments, rails, and curbs where defects are minor. Without further investigation and destructive testing, the extent of the corroded reinforcing bar behind the delaminated areas is unknown. As shown in the Superstructure section the girder ends in most locations had multiple diagonal cracks propagating from the bearing pockets which should be closely monitored for further deterioration and increased cracking. Also, as shown in the Substructure section almost all top corners of the Pier Caps had widespread delamination, cracking and spalls which should be closely monitored for further deterioration and extended areas of delamination.

DCI recommends:

- Use of the bridge should be limited to pedestrian traffic only and no vehicular traffic of any kind should use the bridge until the bridge is repaired or replaced.
- If the deterioration of the bridge progresses noticeably (i.e. new cracking, spalling, delamination, or movement), the bridge should be closed to all users on and below the bridge until another evaluation is performed.
- Close the sidewalks below Piers 1, 2A, 2B, and 3, or install debris netting around the top of these piers and pier caps to protect pedestrians from falling debris.
- Repair the bridge to address the deterioration noted in this report within 1 year. Alternatively, plan to replace with the bridge within the next 2 years. Replacement of the bridge will require planning, funding, and engineering design.
- Monitor the bridge every 6 months to evaluate further deterioration of bridge elements. Special attention should be given to the cracks at the dapped girder ends and to the pier caps.

- Implement a routine inspection program every 12 months using FHWA standards for bridge inspection. The yearly inspection reports should be compared to previous reports to understand the rate of deterioration and to identify new deficiencies.
- If WSU elects to repair the bridge, the repair plans should include the following items at a minimum:
    - Engage an engineering company to identify all bridge elements that require repair and to prepare drawings and specifications for repairs.
    - Remove loose spalls, delaminations, and degraded concrete until sound concrete is encountered.
    - Expose all corroded steel to the point where the steel is no longer corroded, then clean of any corrosion.
    - Patch repair areas with an approved cementitious material.
    - Replace the neoprene bearing pads and corroded bearing plates.
    - Replace bridge joints with a watertight expansion joint seal.
    - Install drains along the bridge with emphasis around the bridge joints to keep moisture away from the elements below.
    - Remove the top of deck wearing surface and stair treads to expose the electric snow melt system and to determine the extent of deterioration to the deck and stair structure.
    - If desired, replace the electric snow melt system for all areas above and below deck.
    - Clean and paint metal rails to prevent further corrosion.

Photo Log

Photo 1: Elevation, Looking Southeast

Photo 2: Elevation, Looking West

Photo 3: Typical Top of Deck, Looking North

Photo 4: Typical Top Deck, Looking South

Photo 5: North Abutment, Looking North

Photo 6: Pier 3, Looking North

Photo 7: Pier 2A and Pier 2B, Looking North

Photo 8: Pier 1, Looking North

Photo 9: South Abutment, Looking South

Photo 10: Typical Underdeck, Looking North

Photo 11: Pier 2 Access Stairs, Looking East


Photo 12: Typical Minor Scaling in Top of Deck, Looking South

Photo 13: Typical Cracking Around Snow Melt Junction Boxes, Looking West

Photo 14: Typical Transverse Cracking in Top of Deck, Looking South

Photo 15: Typical Longitudinal Cracking from Deck Joints in Top of Deck, Looking North

Photo 16: Typical Longitudinal Cracking from Deck Joints in Top of Deck, Looking Southeast

Photo 17: Typical Transverse Cracking in the Underdeck, Looking North

Photo 18: Typical Longitudinal Cracking in the Underdeck, Looking South

Photo 19: Typical Longitudinal Cracking in the Underdeck, Looking South

Photo 20: Typical Longitudinal Cracking in the Underdeck, Looking East

Photo 21: Longitudinal Cracking at Pier 2 Underdeck, Looking South

Photo 22: Span 2 North End Underdeck, Looking North

Photo 23: Spall in Southwest Corner of Span 3 Underdeck Above Pier 2, Looking Southwest

Photo 24: Typical Unsound Patches in West Face of West Girder, Looking East

Photo 25: Typical Unsound Patches in West Face of west Girder Top Edge, Looking Southeast

Photo 26: Diagonal Cracks in West Face of Span 1 East Girder at North End, Looking East

Photo 27: Diagonal Cracks in East Face of Span 1 West Girder at North End, Looking West

Photo 28: Spall in East Face of Span 1 East Girder at Top Corner at North End. Looking West

Photo 29: Spall in East Face of Span 1 East Girder at bottom edge at North End. Looking West

Photo 30: Spall in West Face of Span 1 West Girder at bottom edge at North End. Looking East

Photo 31: Diagonal Cracks in West Face of Span 2 East Girder at South End, Looking East

Photo 32: Diagonal Cracks in East Face of Span 2 West Girder at South End, Looking West

Photo 33: Spall in West Face of Span 2 West Girder at bottom edge at South End. Looking East

Photo 34: Typical North Abutment Steel Connection Bracket, Looking West

Photo 35: Typical Steel Connection Bracket at Pier Caps, Looking West

Photo 36: Typical South Abutment Steel Connection Bracket, Looking West

Photo 37: Diagonal Cracks in West Face of Span 2 East Girder at North End, Looking East

Photo 38: Diagonal Cracks in East Face of Span 2 West Girder at North End, Looking West

Photo 39: Spall in Span 2 East Girder at Northeast corner, Looking West

Photo 40: Spall in Span 2 East Girder at Northeast corner, Looking Southwest

Photo 41: Spall in Span 2 West Girder on the West Face at the North End, Looking East

Photo 42: Sheared off Bolt at Pier 2 Connection Hardware, Looking West

Photo 43: Sheared off Bolt at Pier 2 Connection Hardware, Looking Southeast

Photo 44: Diagonal Cracks in West Face of Span 3 East Girder at South End, Looking East

Photo 45: Diagonal Cracks in East Face of Span 3 West Girder at South End, Looking West

Photo 46: Spall in South Face of East Girder at South End, Looking Northwest

Photo 47: Diagonal Cracks in West Face of Span 3 East Girder at North End, Looking East

Photo 48: Spall in Span 4 East Girder on the East Face at the South End, Looking Northwest

Photo 49: Spall in Span 4 West Girder on the West Face at the South End, Looking East

Photo 50: Spall in Span 4 East Girder on the East Face at the North End above the bearing plate, Looking West

Photo 51: Hairline Cracks with Light Efflorescence in South Abutment West Side, Looking East

Photo 52: Delamination of the South Face of Pier 1 Cap, Looking Northwest (Yellow Lines Show Delamination)

Photo 53: Delamination of the South Face of Pier 1 Cap, Looking Northeast (Yellow Lines Show Delamination)

Photo 54: Delamination of the North Face of Pier 1 Cap, Looking Southeast (Yellow Lines Show Delamination)

Photo 55: Spall in West Top Corner of Pier 1 Cap South Face, Looking North

Photo 56: Spall in East Top Corner of Pier 1 Cap South Face, Looking North

Photo 57: Exposed Wire and Corroded Steel Conduit at Pier 1 Cap, Looking North

Photo 58: Spall in West Top Corner of Pier 1 Cap North Face, Looking South

Photo 59: Delamination in Pier 2, Looking North

Photo 60: Delamination in Pier 2, Looking Northeast

Photo 61: Spall in Northeast Corner of Pier 2, Looking Southwest

Photo 62: Spall in Northwest Corner of Pier 2, Looking Southeast

Photo 63: Spall in Southwest Corner of Pier 2, Looking Northeast

Photo 64: Spall and Scaling in East Face of the Pier 2 Cap, Looking West

Photo 65: Delamination of the North Face of Pier 2 Cap, Looking Southwest

Photo 66: Pier 2 Cap South Face, Looking Northwest

Photo 67: Pier 2 Cap North Face, Looking Southwest

Photo 68: Pier 2 Cap Bottom Face, Looking Northeast

Photo 69: Delamination of the North Face of Pier 3 Cap Top Corner, Looking South

Photo 70: Delamination of the South Face of Pier 3 Cap Top Corner, Looking North

Photo 71: Spall in East Face of Pier 3 Cap, Looking West

Photo 72: Typical Bearing at North Abutment, Looking West

Photo 73: Typical Bearing at Pier 2, Looking West

Photo 74: Typical Bearing at Pier 1, Looking West

Photo 75: Typical Bearing at Pier 3, Looking West

Photo 76: Typical Bearing at South Abutment, Looking Southwest

Photo 77: Typical Minor Impact Damage and Chipped Paint in Metal Rail

Photo 78: Typical Minor Impact Damage and Chipped Paint in Metal Rail

Photo 79: Typical Minor Impact Damage and Chipped Paint in Metal Rail with Typical Rust at Base.

Photo 80: Typical Spalls in Concrete Curb

Photo 81: 4FT Long Spall in Span 3 East Curb at South End, Looking East

Photo 82: Typical Spalls in Concrete Curb

Photo 83: Typical Expansion Joint, Looking North

Photo 84: Typical Expansion Joint, Looking South

Photo 85: Typical Cracking in Stair Treads and Risers, Looking South

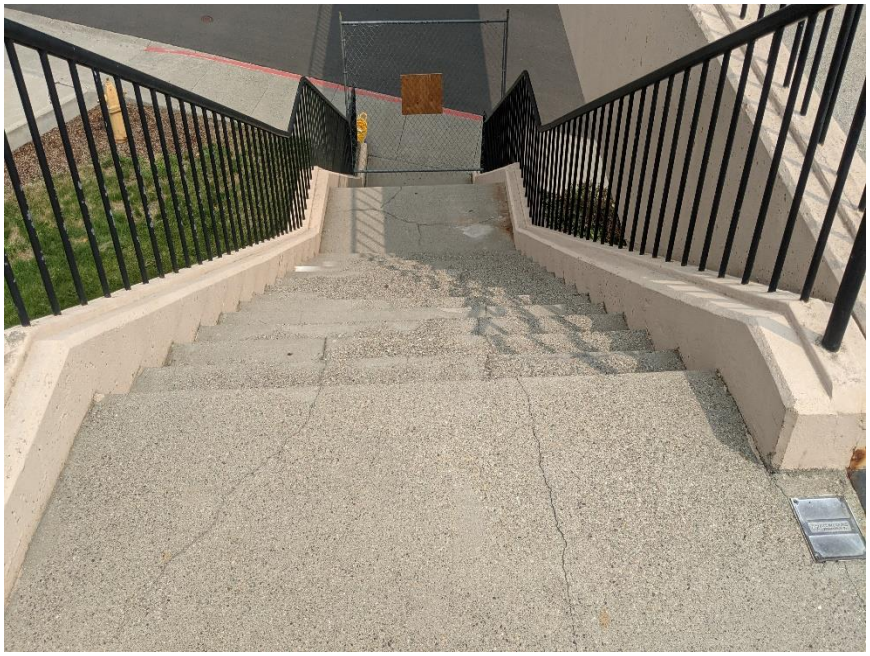

Photo 86: Typical Cracking in Stair Treads and Landings, Looking North

Photo 87: Typical Transverse Cracks and Accumulation in Risers, Looking South

Photo 88: Cracks in Bottom Two Stairs, Looking South

Photo 89: Typical Cracking and Staining in Underdeck, Looking North

Photo 90: Typical Cracking and Rust Staining in Underdeck, Looking South

Photo 91: Delamination in Top Northwest Corner of Pier 2B, Looking South

Photo 92: Delamination and Cracking of the North Face of Pier 2B Cap Top Corner, Looking South

Photo 93: Delamination and Cracking of the South Face of Pier 2B Cap Top Corner, Looking North

Photo 93: Spall in Underside of Pier 2B Cap at East End, Looking East

Photo 95: Spall in North Bottom Edge of South Stair Girder, Looking South

Photo 96: Spall in Southeast Bottom Corner of South Stair Girder, Looking East

Photo 97: East Bearing at Pier 2B Cap, Looking Southeast

Photo 98: West Bearing at Pier 2B Cap, Looking Southwest