DR 4269 TX

Bastrop County TX

Pedestrian Bridge (Lower Elgin Rd)

Technical Team Site Visit Summary (3/8/17)

The Technical Team conducted a site visit of the Lower Elgin Road pedestrian bridge on March 8th, 2017 to assess the facility and identify damages that may have resulted from the declared event DR 4272 TX with incident period from May 22nd, 2016 through June 24th, 2016. During the site visit, the Technical Team observed an old, single lane vehicular bridge comprised of a truss main span that spans between two primary bents with approaches on either side consisting of beams on secondary bents. The bridge deck is made up of wood planks placed tightly in a transverse configuration and additional wood planks longitudinally in the wheel paths. A rectangular metal tubing railing supported on channel posts extended the full length of the structure along both sides of the deck.

The bridge deck was measured to be 250 feet long with the main span being about 120 feet long and the approaches varying in length from about 50 feet to 80 feet in length. The bridge deck was measured to be 15 feet wide and was made up of 2 inch x 8 inch x 15 foot rough sawn planks transversely across the bridge with 2 rows of various length 2 inch x 12 inch rough sawn planks in each wheel track for the full 250 foot length of the bridge. The transvers planks were secured to the bridge's supporting beam structure with a 2 inch x 8 inch rough sawn planks intermittently fastened to the beam running the full length of the bridge deck on either side of the deck. The bridge deck appeared to have had some maintenance occur prior to the event with the replacement of some transverse planks and re-fastening of wheel track planks.

The bridge deck appeared to have floated or been hydraulically lifted off the bridge's supporting beam structure by the flood water at multiple locations throughout the full length of the bridge. In a few locations, the transverse and wheel path planks were missing completely. Throughout the length of the bridge deck debris was found to be wedged between the deck planks and bridge's supporting beam structure. See attached Photos 5, 6, 7 & 8 of the site visit photos.

The railing on both sides of the bridge's south approach was damaged from what appeared to be a tree falling across the bridge approach during the event. The remnants of the fallen tree had been removed and only the splintered tree stump remains next to the approach. See attached Photos 2, 5 & 6 of the site visit photos.

The bent supporting the south bridge approach in the immediate area of the splintered tree stump and damaged railing appeared not to be vertical. The bent may have been damaged and rotated slightly as a result of the tree falling and impacting on the bridge approach. See attached Photo 3 of the site visit photos.

The stem-wall abutment for the south approach was observed to be rotated. No signs were observed that indicated how or when the stem-wall rotated, however, the stem-wall abutment is in the immediate vicinity of the splintered tree stump and appeared to be rotated in the same direction as the rotated bent. With flooding and saturated soil conditions and in addition a large tree impacting the

approach near the stem-wall, it could be reasonably assumed that the rotation may have occurred as a result of these combined events. See attached Photo 4 of the site visit photos.

At the bridges north approach, one of the secondary bents was observed to have been undermined by scour. See attached Photo 10 of the site visit photos.

Under the bridges main span, two of the bridges tension rods were observed to be damaged. One of the tension rods was hanging from the bridge. See attached Photo 9 of the site visit photos. The other tension rod was bound up with debris, under the deck and extended through one of the beams.

Damage Description

The damage resulting from flooding was identified as:

1. Damaged edge planks with fasteners (2 each, 2 inch x 8 inch in various lengths) 250 FTL x 1.33 FTW = 332.50 SF (500 LF Total)
2. Damaged wheel track planks with fasteners (4 each, 2 inch x 12 inch in various lengths) 250 FTL x 4 FTW = 1,000 SF (1000 LF Total)
3. Damaged transverse (2 inch x 8 inch x 15 foot long) wood plank decking, 250 FTL x 15FTW = 3,750 SF (2497.5 LF Total)
4. Damaged railing 120 FT (made up of 2 runs of 1 inch x 2 inch rectangular metal tubing supported by C3x6 channel posts spaced every 10 feet). = 1500 lbs of steel
5. Damaged secondary bent supporting bridge approach.
6. Damaged stem-wall abutment at southern bridge approach.
7. Damaged (scoured and undermined) bent foundation 20 FTL x 12 FTW x 4 FTD = 960 CF / 27 = 35 CY
8. Damaged tension rods, 2 each, 5/8 inch diameter x 25 FTL = 50 FT

Scope of Work

The following scope of work describes the work needed to repair damages resulting from the event:

1. Remove and replace damaged edge planks with fasteners (2 each, 2 inch x 8 inch in various lengths) 250 FTL x 1.33 FTW = 332.50 SF (500 LF Total)
2. Remove and replace damaged wheel track planks with fasteners (4 each, 2 inch x 12 inch in various lengths) 250 FTL x 4 FTW = 1,000 SF (1000 LF Total)
3. Remove and replace damaged transverse (2 inch x 8 inch x 15 foot long) wood plank decking, 250 FTL x 15FTW = 3,750 SF (2497.5 LF Total)
4. Remove and replace damaged railing 120 FT (made up of 2 runs of 1 inch x 2 inch rectangular metal tubing supported by C3x6 channel posts spaced every 10 feet). = 1500 lbs of steel
5. Repair/straighten and make plumb, damaged secondary bent supporting bridge approach.
6. Repair/straighten and make plumb, damaged stem-wall abutment at southern bridge approach.
7. Replace and compact scoured and undermined material under and around bent foundation, 20 FTL x 12 FTW x 4 FTD = 960 CF / 27 = 35 CY
8. Remove and replace damaged tension rods, 2 each, 5/8 inch diameter x 25 FTL = 50 FT

RSMeans was used to estimate the cost of repairs = $121,500

See attached "Lower Elgin Rd RSMeans Repair Estimate.pdf"

Total Estimated Repair Cost = $121,500

Pre

Mitigation

During the incident period of April 17 through April 30, 2016 severe storms and heavy rain caused damage to facilities that are owned and maintained by Bastrop County, including the bridge on Lower Elgin Road now used as a pedestrian bridge (30.22252, -97.40952). The applicant refers to this as Lower Elgin Rd Pedestrian Bridge.

During previous disaster events (May 26, 2015, October 30, 2015) flowing flood waters in the Wilbarger Creek rose and overtopped the pedestrian bridge damaging the bridge. On April 30, 2016, strong winds caused a tree to fall on the bridges south approach causing additional damage.

The Repair In-Kind Costs at the facility are estimated at $121,500. Estimated using RSMeans.

In order to prevent future damage from similar future events, the applicant proposes to complete mitigation measures at the site. The measures include placing Rip Rap at the location of the bridge's scoured bent foundation. The repair and mitigation scope of work for completed work is as follows:

1 – Install Rip Rap RSMeans 313713100200, 20 FTL x 15 FTW = 300 SK / 9 = 33.33 SY

Rounding up say 34 SY of 18 inch thick Rip Rap

RSMeans was used to estimate the mitigation cost = $4,075

See attached "Lower Elgin Rd RSMeans Mitigation Estimate.pdf"

Total Estimated Mitigation Cost = $4,075

MIT

Since the HMP Cost / Repair In-kind Cost = $4,075 / $121,500 = 3.35% < 100%, this HMP is cost effective per PAPP FP 104-009-2 - Jan. 2016 pp 94-95 and Appendix J, General 1. Drainage Crossings.

This HMP is considered cost effective according to PAPP FP 104-009-2 / Jan. 2016 pp 94-95 and Appendix J, General 1. Drainage Crossings, and does not exceed 100 % of the project Cost. This HMP is subject to further review. This HMP is for estimating purposes only and is not to be construed as a project design. The final design, placement, and configuration are the responsibility of the Applicant. When completed, this mitigation measure must remain cost effective. Cost over-runs may not be eligible for FEMA funding without a Change of Scope request and subsequent review that verifies the project's cost effectiveness.

EHP NOTES: The footprint area of the completed mitigation and repair is the same as the pre-disaster footprint. NO adverse effects as a result of this project per the H&H attached.

ADDITIONAL INFORMATION FOUND

Additional information regarding the bridges condition prior to and after flooding was found at the "Lower Elgin Road Bridge, Bastrop County" website:

http://lowerelginroadbridge.com/

Based on information from the website, the bridge was built in 1888 by the Kansas City Bridge and Iron Co. of Kansas City, Missouri as one of a group of four bridges authorized by the Bastrop County Commissioner's Court. The bridge was in continuous, daily use from its construction in 1888 until a new bridge was built in 1997. Although the bridge was closed to vehicular traffic after the construction of the new bridge, it remained open to pedestrian traffic until the May 2015 flood caused significant damage to the decking. The County closed the bridge to all traffic as a result of this damage.

At the website, under the "Current Info" menu in "Bridge Damage Status" information regarding pre-flood condition and post-flood condition can be found. Based on the information found at the website, the deck was damaged as a result of flood events occurring May 2015, and late October 2015. April 30th, 2016 the tree fell on the bridge as a result of strong winds damaging the railing, and decking on the south approach, possibly affecting the south approach bent and stem-wall abutment. Please refer to the attached "Lower Elgin Road Bridge, Bastrop County Website Pictures".

ATTACHMENTS

1 - Location and Site Map.pdf

2 - Bastrop Co Ped Bridge Lower Elgin Site Visit Photos 3-8-17.pdf

3 - Lower Elgin Road Bridge, Bastrop County Website Pictures.pdf

4 - Lower Elgin Rd RSMeans Repair Estimate.pdf

5 - Lower Elgin Rd RSMeans Mitigation Estimate.pdf