



## MEMORANDUM

**TO:** Elizabeth Nijkamp, Engineer Review Manager, El Paso County

**FROM:** Kendra Gabbert and Alivia Plankis, FHU

**DATE:** 06/29/2021

**SUBJECT:** **On-Call Contract #17-067H-1; PO # 8113073**  
**Bridge Reviews**  
**Task Order #6: Mesa Top Bridge Submittal - Third Review**

This memorandum provides a list of comments for the 3<sup>rd</sup> Submittal of the Mesa Top Bridge, based on requirements in the County's Engineering Criteria Manual (ECM), 2019 CDOT Standard Specifications for Road and Bridge Construction, Current CDOT Bridge Design Manual and the Current CDOT M&S Standards Plans.

### Comments

There were multiple comments from the second submittal which were not addressed. The remainder of the comments on this third submittal apply to the new HEC-RAS model which was not previously provided.

Per El Paso County's list of documents typically required for the Structure Record, the following documents have still not been submitted as previously requested:

- ✓ Contech Independent Design Check Calculations File with "Contech\_" in the title is a second set of calculations for superstructure
- Project Provisions – It was noted with the 2<sup>nd</sup> submittal that no Project Provisions were required for the bridge substructure. A similar note or the applicable project provisions for the superstructure and channel work needs to be provided. Still not provided

### Hydraulic Submittal

#### HEC-RAS Output and Scour Calculation comments:

- ✓ Proposed conditions section 700 shows encroachment for both Qs (3123 and 1932) on the left overbank. The contraction coefficient for that section should be increased. A typical value of 0.3 is often used. Indicated in report text that a value of 0.3 was used. The HEC-RAS file was not included so was not verified.
- 2. Pier width is shown as 4 feet in the contraction scour calc which does not match the plans. (Comment 7 from this section in Second Review memo). Contraction scour was not included in this submittal.
- 3. The ground geometry in the bridge cross-section shown in the contraction scour does not match the ground geometry of the same section in the HEC-RAS model. Please make sure the correct geometry is used in the scour calculations. In general, confirm proposed ground geometry at the bridge. The Bridge Hydraulic sheet shows sections at the bridge with a high point in the middle of the channel, but the pier scour calc and the HEC-RAS model shows those high points removed at the bridge sections. Also, see next comment about the Q100s. The contraction scour should be run with the higher Q if that is the design flow. Contraction scour and HEC-RAS file were not included in this submittal so this could not be checked.

4. Clarify the different Q100 values and which values is being used for what analysis. From the report, it sounds like the Q100=3123 cfs is the design flow for the project. If that is the case, this flow should be used for scour analysis and riprap design. Otherwise, justify why the Q100=1932 was used to calculate scour. Is Q100=1932 cfs only used for showing no impact in the floodplain?
5. Discuss in hydraulic report where grain sizes D50 and D90 come from. (Comment 8 from this section in Second Review memo). Discussion was added in the report.

**Hydraulic Report:** They should include the updated Bridge Plans from Steamboat Structures

1. Where did the soil D50 come from that was used in the contraction scour calculations? How was the riprap sized? Please provide riprap sizing calculations. Riprap sizing calculations were not provided.
2. Add discussion about increase in water surface elevation at section 700 from 7056.80 ft (existing conditions) to 7056.89 (developed conditions). Is this increase within the criteria to not require a CLOMR for this project? The HEC-RAS model was not provided and the HEC-RAS printouts in the appendix are for the higher Q100. I can't confirm if there is still a rise in the water surface elevations and the report discussion does not address if there's a rise that would trigger a CLOMR.
3. Make sure the final version of the report includes all calculations and supporting documentation like the complete scour calcs, riprap sizing, HEC-RAS print outs, etc. Contraction scour calculations and riprap sizing calculations were not provided.

**Bridge Hydraulic Information Plan Sheet:**

1. How are the plan view limits of riprap being defined? What is the riprap size? Is there bedding or geotextile proposed? (Comment 1 from this section in Second Review memo). Did not see any updates on this
2. Show scour limits. (Comment 2 from this section in Second Review memo). Did not see any updates on this

**Contech Superstructure Calculations and Plans:** Another item noticed: Bottom longitudinal reinforcing in deck on plans doesn't match calcs

1. Dimensions of inside top flange splice plate does not match calculations. Update calculations or plans for applicable correct dimensions. IDC calculations have updated plate width and thickness. Did not provide updated calculations. Also need to update outside and inside splice plate details to coordinate plate width with table.

**Bridge Substructure Calculations:**

1. Coordinate and check that substructure calculations are still valid when the scour comments are addressed. Steamboat structures included two memos on the scour and water elevation updates with explanation for why design was not impacted

**Conclusions**

Based on the comments above, we feel that the hydraulic report and Bridge Hydraulic Information Plan Sheet should be updated and resubmitted. When these are resubmitted, detailed responses to each of the above provided comments for how each comment was addressed or why a comment was not incorporated should also be provided.