BRIDGE SCOUR ASSESSMENT FORM

1. Division: 08 County: Creek Local Id: NBI#: 00178

2. Structure No.: 19E0670N3650007 River /Creek Name: BUCKEYE CREEK

3. Bridge Length: 42 ft Bridge Width: 14.20 ft

4. Type of Foundation: Unknown Spread footing Pile Bents Pile Footings Drilled Shafts Culvert

5. Channel bed material: **TYPE – silt/clay, sand, gravel, cobble/boulders, bedrock SIZE – fine, medium, coarse**

UPSTREAM_____ UNDER BRIDGE_____ DOWNSTREAM _____

STREAM STABILITY

6. Flowline Measurement/ Location From Last 10 Inspections:

7. Vertical Stability

Degradation (flowline measurements increasing)/ aggradation (flowline measurements decreasing) of flowline?

Describe: Are substructure elements exposed

8. Lateral Stability

Has channel moved toward abutment or floodplain pier? Are piers originally on floodplain now in main channel?

Describe:

9. Check yes for any that apply and describe

Yes

___ Bridge located near bend: upstream / downstream _____

___ Steep vertical banks, sloughing: upstream / downstream_____

___ Bed deposits, islands or point bars: upstream / downstream / under bridge _____

___ Nearby tributary, or confluence: upstream / downstream _____

___ Nearby bridge, culvert, control structure: upstream / downstream _____

10. BRIDGE SCOUR POTENTIAL

Are there observed or potentials scour problems at bridge? Describe

___ High-water marks _____

___ Angle of attack on bridge/ or piers: normal flow: _____ flood flow: _____

___ Scour holes near abutments, piers: _____

___ Bridge rail sagging _____

___ Abutments tilting in moving_____

___ Approach panel cracking or settlement_____

___ Debris build up or potential _____ _____

___ Damage to existing countermeasures, riprap, abutments, piers, dikes etc _____

11. BRIDGE APPRAISAL RATING

NBIS Item #	current	previous	comments
60 – Substructure	_____	_____	_____
61 – Channel	_____	_____	_____
71 – Waterway	_____	_____	_____
113- Scour	_____	_____	_____

12. Recommended Item 113 coding: **Recommended Inspection Freq.:**

POA needed?

13. Scour Elevation: [if computed] **Foundation Bottom Elevation:**

14. REMARKS:

15. Date Inspected: **Team Leader**

16. Date Assessed: **Program Manager**

17. SIGNED (must be signed, sealed, and dated by Program Manager approved in Contract)

PE seal, date

Instructions for Completing Bridge Scour Assessment Form

The Bridge Scour Assessment form is a simplified non analytical evaluation which results in a conservative assignment of the coding of item 113. A hydraulic analysis is not required to perform this procedure. The Oklahoma Department of Transportation(ODOT) has developed this to reduce time and cost of evaluating local bridges for scour. This form and procedure is meant to document and provide guidance in evaluating existing bridges for scour vulnerability and not an exact analysis.

The Bridge Scour Assessment shall be completed by a professional engineer familiar with the bridge and site conditions . Locate and review as much of the recommended information to perform a scour assessment as you can. These include: plans, past inspection reports, photos, flood info, scour reports, USGS Quadrangle maps, aerial photos (different times to compare river course through bridge), any soils logs, data or reports for the area. Although a field review ma not be necessary if the engineer doing the assessment is familiar with the bridge, in some cases it allows the engineer to see and document the conditions as they currently exist.

The BSAF may be used in lieu of or as a prescreening for the HEC 18 analysis method. In many instances the BSAF may tend to give more conservative results. In order to avoid costly scour countermeasures or monitoring that may be indicated for certain bridges because of this, it may be prudent to perform an analysis using the procedures from HEC 18.

Using the document generated from the bridge list for your area find the bridge that you will be assessing. You will also need the bridge file, all past inspections, any photos and plans available.

The automated document completes Lines 1, 2, and 3.

Line 4 [Type of Foundation] circle the appropriate answer, if no plans exist circle unknown too. If you can tell its spread footing but have no plans circle both unknown and spread footings. If there are pile bents in the overbank[ob] and pile footings at the banks[b], circle both and write "ob" or "b" below. If you are assessing a RCB, circle culvert and use the Pontis Manual C-25 and figure rating and frequency and complete this form from line 12 through line 20. If you have drilled shafts circle and go to line 12 item 113 = 8 and frequency = 2 yrs. Drilled shafts have been designed for maximum scour.

Line 5 [Channel bed material] complete using data from plans and field observation; both the type and size for upstream, downstream and under bridge. So upstream may just have a sandy clay bed where downstream has sandy clay bed with rock. This may be an indication that a prior countermeasure placed has failed (riprap around the piers)

Line 6 [Flowline Measurement] complete using measurements and locations from previous inspections, flowline measurements may not always be in flowline notes. If there is a location where flowline is, write that in. Pontis has the flowline profile data and location in the Oklahoma items. Compare those to se if channel is migrating. Look through all flowline measurements to determine if degradation has or is occurring and if it is stabilized. Record any comments or conclusions you feel make the bridge more vulnerable or susceptible to scour after reviewing these items

Line 7 and 8. [Vertical and Lateral Stability] based on measurements and field observation, has degradation or lateral movement occurred? If so, describe. Degradation can expose substructure members, or cause sloughing of the banks under the bridge, making the bridge unstable. Likewise lateral movement could change the flows angle of attack, hitting piers or abutments at unfavorable angles. Flood plain piers could become channel piers. Record any comments or conclusions you feel make the bridge more vulnerable or susceptible to scour after reviewing these items

Line 9 [Check yes for any that apply and describe] further defines the stream stability, circle location observed and describe. The more of these items occurring, the more likely it is that scour will occur. Document your observations and take pictures for future comparison.

Line 10 [Bridge Scour Potential] . The more of these items occurring, the more likely it is that scour will occur. Document your observations and take pictures for future comparison. If the inspection reports or document files have any flood information or highwater marks, write them in the comment line. The best way of evaluating flow conditions through the bridge is to look at and photograph the bridge from the up- and downstream channel. Is there a significant angle of attack of the flow on a pier or abutment? Is there evidence of movement of piers and abutments; rotational movement , settlement (check lines of substructure and superstructure, bridge rail, etc., for discontinuities; check for structural cracking or spalling) Check bridge seats for excessive movement. Damage to scour countermeasures protecting the foundations (riprap, guide banks, sheetpiling, sills, etc.). Examples of damage could include riprap placed around piers and/or abutments that has been removed or replaced with river run bed material. A common cause of damage to abutment riprap protection is runoff from the ends of the bridge which flows down to

the riprap and undermines it. This condition can be corrected by installing bridge-end drains. Changes in streambed elevation at foundations (undermining of footings, exposure of piles), and changes in streambed cross section at the bridge, including location and depth of scour holes.
Note and measure any depressions around piers and abutments. Note the approach flow conditions. Is there an angle of attack of flood flow on piers or abutments?
Substructure
_ Is there evidence of scour at piers?
_ Is there evidence of scour at abutments (upstream or downstream sections)?
_ Is there evidence of scour at the approach roadway (upstream or downstream)?
_ Are piles, pile caps or footings exposed?
_ Is there debris on the piers or abutments?
_ If riprap has been placed around piers or abutments, is it still in place?
b. Superstructure
_ Evidence of overtopping by flood water (Is superstructure tied down to substructure to prevent displacement during floods?)
_ Obstruction to flood flows (Does superstructure collect debris or present a large surface to the flow?)
_ Design (Is superstructure vulnerable to collapse in the event of foundation movement, e.g., simple spans and nonredundant design for load transfer?)
c. Channel Protection and Scour Countermeasures
_ Riprap (Is riprap adequately toed into the streambed or is it being undermined and washed away? Is riprap pier protection intact, or has riprap been removed and replaced by bed-load material? Can displaced riprap be seen in streambed below bridge?)
_ Guide banks (Spur dikes) (Are guide banks in place? Have they been damaged by scour and erosion?)

Line 11 [Bridge Appraisal Rating] Using this inspection, and the previous inspection compare the ratings of the substructure, channel, waterway, and scour. Rating of item 60 should be consistent with item 113. When item 113 is rated less than or equal to 5 a scour smart flag exists that could give you additional information to contribute to your scour assessment. Place any of these in the comments.

Line 12 [Recommended Item 113 coding] Use NBIS coding Guide or Pontis Bridge Inspection Manual to code item 113. Recommendations for coding culverts can be found in Pontis Manual on page C 25. Record any comments or conclusions that helped in forming your rating in the remarks section.

> **IF bridge is a RCB go to Pontis Manual C-25 and figure rating and inspection frequency**
>
> **IF bridge is currently coded scour critical (item 113 <= 3) use that coding. (Unless countermeasures have been placed and are effective, then item 113 = 7)**
>
> **For code of 3 or less inspection frequency should be annually, and after a major flood. POA's are required for all bridges with item 113 < = 3 or = U. A POA will be generated automatically in Pontis. With you county/ city on the Pontis desktop, select reports on left side, then hit drop down menu for scour critical POA. Generate report for all bridges listed on inspection desktop**

Line 13 [Scour Elevation and Foundation Bottom Elevation] If you have scour computations enter the elevation that is worst case for the foundation element associated with it. Enter the foundation bottom elevation associated with the previous scour elevation.

> **For instance, if at pier 1, Computed Scour elevation = 613.20' and Foundation Bottom elevation = 611.60' and at pier 2, Computed Scour elevation = 612.20' and Foundation Bottom elevation = 614.60'; you would enter the info for pier 2**

Line 14 [Remarks] enter anything that factored in your decisions and rating.

Line 17 [Signed] must be signed sealed and dated by Program Manager approved in Contract

********UPDATE PONTIS, MAKE COPY FOR MASTER FILE. GENERATE AND COMPLETE POA's USING PONTIS USER REPORTS.**
THERE MUST BE A COPY OF THIS COMPLETED DOCUMENT; SIGNED, SEALED, AND DATED IN EACH BRIDGE MAINTENANCE FILE FOLDER IN THE MASTER FILE LOCATED AT THE FIELD DIVISION OFFICE.