

Missoula, MT 59804
August 17, 2012

Montana Department of Transportation
Missoula District
2100 West Broadway
Missoula, MT 59807

Missoula County Commissioners
200 West Broadway
Missoula, MT 59802

Re: Maclay Bridge Study Comments

Dear Commissioners and MDT:

I am a civil engineer living within the study area of Maclay Bridge. I along with several others have been following the Maclay Bridge Planning Study closely since the July 10 meeting and have become very concerned about how the study is proceeding and particularly what it is ignoring. For example, I learned at the Tuesday, August 14 meeting that the study will not consider the existing problems with the current bridge such as the environmental problems the old bridge has caused to the river channel; the health issues associated with the attractive nuisance it has become; and the safety issues—with very substantial attendant county legal liability—that are all due to the current location and design of the old bridge.

Since one of the options that will be considered in this planning analysis will be “no action”, that is, to retain the old bridge as it is, frankly it is astonishing to me that you or any county or state official would consider basing your decision to select an option without this vital information about the current situation. As I understand it, the environmental, health, safety, and other issues will all be considered for all of the other options including the 1994 Preferred Alternative at South Avenue—but not for the current bridge situation. This is astounding and absolutely defies common sense.

In addition, I have learned that information recently retrieved from the County archives show that there are no “as built” plans for the current bridge arrangement. This bridge is a hodgepodge of truss, pony truss, and two steel reinforced concrete spans that has very uncertain parentage to say the least. The plans that have been found show that it is unknown or at best highly uncertain what the foundation conditions are under the bridge piers and abutments. Some “proposed plans” show that pilings might have been used and other plans show no pilings. If there were pilings, they likely were wooden posts driven in to the “point of refusal” using the

equipment of that period and almost certainly those pilings have become structurally incompetent since that time! Thus no one knows if the current bridge supports are safe from a stability standpoint. It is also clear no one really knows the age or condition of the steel in the current bridge truss spans. They all appear to be recycled parts from bridges that may date from the 1920's or even older. It appears, from my visual inspection that a few of the original decking support steel girders were replaced when the temporary galvanized deck was installed. All of the girders should have been replaced at the same time since they were of the same age as the defective ones. Has anyone at the County or State considered or tested the steel in these girders to determine their current actual load capacity? I have seen no evidence that you have. It is also incomprehensible to me as an engineer that no attempts have been made under water or below soil grade to evaluate the current bridge pier footings. The current scour hole is one of the deepest I have ever seen for a bridge of this construction style. The bridge's overall safety is clearly a serious question. Please keep in mind that since 1989, more than 600 bridges have failed in the U.S. and certainly some of them had been more rigorously inspected than this bridge.

Another fact I have learned is that a past Missoula County engineer stated in an email that the current bridge would not withstand a 100 year flood event. As you may know, bridges are usually designed to withstand at least a 500 year event, a much larger flood than a 100 year event. Residents living near the bridge have asked county engineers to look into this vital issue since it does not seem possible that you can make an informed decision on whether to keep the current bridge with such an important and basic stability question unanswered. I have recently learned that FEMA (Federal Emergency Management Agency) analyses and maps that the County engineers found on file with the County show that it is indeed likely a 500 year flood event would over top the deck of the current bridge and a 100 year event would likely come very close, if not overtop, the deck as well. Overtopping means the bridge would be washed out of course. Flood levels near to overtopping would likely overpower the structurally compromised and severely cracked concrete in the piers and spans, resulting in complete bridge failure. Thus the old bridge has even more uncertainty and risk attached to it than is publicly known or that is disclosed in the current planning study.

The only way to refine this FEMA determination on whether a 100 year flood event would overtop and washout the old bridge would be to conduct a survey of the bridge channel upstream of the current bridge, with channel profiles and elevations determined every 100 yards or so. Those profiles would then be entered into a computer program called "HECRAS" for determining bridge breach analysis. The USGS maintains a website with Montana Flood Frequency Basin Data that is useful in such determination.

You should note that the FEMA analysis of flood events the county engineers recently found only considered Bitterroot River peak flows of 31,000 cubic feet per second, but the peak

recorded flow for the Bitterroot near Missoula was much larger: 38,300 cubic feet per second in 1899, based on U.S. Geological Survey records. Based on advice obtained from a local geotechnical engineer who is an expert on such matters, I have learned a more detailed type of bridge analysis to determine Maclay Bridge's susceptibility to floods would be easy to do, relatively inexpensive, and very informative for decision makers such as yourselves.

It is difficult for me to believe your current bridge planning study could assume it is "safe" to continue using this bridge without a complete engineering analysis of it, which would include among other things: 1.) under water and below soil grade examination and testing of the piers and abutments, 2.) steel testing of the structural components, and 3.) a detailed site-specific hydrologic study of the bridge channel and an analysis of the flood levels in relation to the bridge during 100 year and 500 year flood events. It would be completely irresponsible to make any decisions to retain the old bridge unless a new comprehensive engineering analysis proves the structure is sound.

In summary, I have conducted a visual inspection of the bridge, reviewed information obtained from the County, and studied the alleged plans of construction for the existing so-called 3 bridge system. By the way, the bridge is actually made up of 4 spans, not 3, and the plans are not clearly labeled as to what they depict, a proposal for a bridge design or an "as built" record. My visual inspection revealed cracked and spalling concrete piers and bridge supports with rusting rebar exposed; deteriorated wooden shims instead of concrete or steel used to support the eastern concrete span; missing grout and improper joint alignment in bridge spans; an extremely hazardous and unshielded high pressure natural gas line; and rusted girders that should have all been replaced when the County replaced the decking. Based on that review, I would not permit my children to ride inside a school bus crossing over this bridge during high water. I hope the current planning study and your future decisions regarding the bridge will seriously consider the points I have made. I have attached nine recent photos for your information showing just some of the bridge's problems.

Thank you for your consideration of my comments.

Sincerely,

/s/ James Akers

James Akers