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May 1, 2006

Mr. Kenneth Bunde, Chairman
Lake Pelican Water Project District
PO Box 172
Watertown, SD 57201

Re: February 21, 2006 Letter from Mr. Edward Haffke

Dear Mr. Bunde:

This letter is in response to the letter Mr. Edward Haffke of the U.S. Army Corps of Engineers sent to the District on February 21, 2006. Attached is a copy of that letter. The following addresses the nine comments and concerns Mr. Haffke raised in his letter.

Comment 1, page 14. 1979 peak instantaneous flows at the near Watertown USGS gage was 7,800 cfs, not 5,800 cfs.

> ***Response:*** Concur. On page 14 of our report it says that the peak instantaneous flow at the "near" Watertown USGS gage was 5,800 cfs. It should have read . . . the peak instantaneous flow at the "at" Watertown gage was 5,800 cfs . . . the peak discharge at the "near" Watertown gage is 7,800 cfs. This flow information was obtained directly from a report entitled "*Upper Big Sioux River Hydrology*" by John R. Little, PE, June 1998. Correction of this typographical error does not alter the analysis or recommendations from our report.

Comment 2, page 14. The 1997 flood was only a 35-year event for the instantaneous peak discharge at the near Watertown gage based on the 2000 reevaluation study. However, the 15-day total runoff volume for that same gage was slightly greater than the 100-year event based on the Corps 1994 *Feasibility Study Flood Control for Watertown and Vicinity.*

> ***Response:*** Concur. The hydrologic analysis of the 1997 event was conducted by various agencies, and was not replicated by our analysis.

Comment 3, page 16. Why was the 1997 flood event not used for calibration of the HEC-HMS model since it was the flood of record?

> ***Response:*** There were several reasons why Barr did not model the 1997 flood event. We did have precipitation data for the rainfall that fell during this event. But to calibrate the event we would have also needed to combine the rainfall with the snowmelt that was occurring during the

same time, and snowmelt data was not available. More importantly, with the temperature drop that occurred on the evening of April 5th 1997, much of the flooded area north of Watertown froze. The Army Corps of Engineers HMS software which was used for our modeling was not able to accurately represent the freezing that happened in the river. Further complications include the unsteady flow conditions with flows in and out of Lake Kampeska. The HEC-HMS computer model can not handle these freeze/thaw and unsteady flow conditions that occurred during the 1997 event.

Comment 4, page 18. For the 14 locations where the existing culverts will be completely restricted and flows allowed to pond and flow over into the adjacent watershed, how will ponded water below the natural divide be removed?

Response: In each of these locations, water has the opportunity to flow in two directions. In those cases a diversion structure was modeled to direct the water in one direction only. Little or no ponded water is intended to be created below the natural divide.

Comment 5. What are the estimated costs to build and configure all the necessary road raises, small dams, culvert restrictions, and culvert installations?

Response: The cost estimates to build the various components of the surface water management plan will be performed once the District obtains sufficient funds to direct Barr to prepare those cost estimates. However, we would like to point out that because much of the vital infrastructure for the surface water management plan is already in place, it is our belief the cost the implement the plan build-out will likely be comparable if not less than the cost of a single large dam in the Big Sioux River near Mahoney Creek. Further there would be far more benefits and "bang for the buck" with the District's watershed-wide approach to managing waters over the one-dam approach proposed by others. Those added benefits would include:

a) Improved water quality in the Big Sioux River

b) Reduced creek, stream and river bank erosion which is likely a major source of the siltation that has occurred in Lake Kampeska and Lake Pelican

c) Enhanced ground water recharge which in turn results more regular, steady base flows in the rivers and streams through out the Big Sioux River Headwaters Area

d) Enhanced wildlife habitat

Comment 6. What are the estimated costs of operation and maintenance for all of the sites?

Response: The District will prepare estimated costs for operations and maintenance for the various structures identified in its surface water management plan once it obtains sufficient funds to perform the cost estimates. However, it should be noted that 96 percent of the projects the

District plans to undertake simply involve raising existing rural roads and placing flow restriction devices on the upstream end of existing culverts and bridges throughout the Big Sioux River Headwaters Area. Those existing roads, culverts and bridges are already being maintained by the respective owners, which is typically the County, if it's a County road; a Township, if it's a Township road. Because a large amount of the work involves raising roads that currently wash out; or involves reducing peak flows through constructing culvert flow restrictions; the operation and maintenance costs for these structures, road and culvert; in all likelihood, will be less than what currently collectively is being spent by the respective, Township, County, or State agency because there will be significantly less washouts. Also the Davis Bone's Farm Flow Control Structure, built by the District in 2002 as a demonstration project, has required no maintenance at all since it was built. Based on its performance, it is likely that minimal maintenance will be required over its design life.

Comment 7. What are the costs of the real estate easements for incremental increase in property to be flooded by the construction of small dams and constricting flow through existing culverts?

Response: The District will prepare cost estimates for real estate easements when it obtains sufficient funds to prepare such cost estimates. However, it should be noted that as part of a request by Governor Janklow while in office, the District polled more than 80 percent of the property owners that would receive incremental flooding due to road raises, culvert restrictions, and construction of small dams. Based on this polling, it was determined that the vast majority of the property owners would not require the District to purchase a flood easement for the incremental flooding, provided the flooding would not significantly impact structures or agricultural operations. The computer model the District has developed can be used to show each property owner how long and to what height flooding will occur for a 100-year event and smaller more frequent events. It is the District's plan to not negatively impact any structures and to minimally impact any agricultural operations. .

Comment 8. Since the lowering of flows is dependant upon the altering of road crossings, restricting or adding culverts, and adding small dams which require an extensive operation and maintenance program to retain its effectiveness, will the FEMA Emergency Management Agency certify a reduction in the 100-year floodplain for the city of Watertown?

Response: A hydrologic analysis must be completed to reduce 100-year flows for streams in the FEMA FIS program. The analysis must reflect the modifications to the upstream crossing and must be submitted to FEMA through a Letter of Map Revision (LOMR). Operation and maintenance programs are not requested in the LOMR application, and FEMA does not review operation and maintenance programs. The LOMR must also include a revised hydraulic analysis that is based on the modified flow rates. FEMA will certify revised floodplains that are based on updated hydrology and hydraulics that accurately reflect the physical watershed conditions, such as the construction projects the District plans to perform.

Comment 9. Not modeling the interaction with Lake Kampeska is a serious flaw in the analysis, since Lake Kampeska stage is a major factor controlling flood flows through Watertown.

Response: The modeling was intentionally stopped just upstream of Lake Kampeska because the Lake Pelican Water Project District boundary for the Big Sioux Headwaters Area ends just upstream of Lake Kampeska. However this does not constitute a major flow in the analysis. Modeling the flows in and out of Lake Kampeska and through Watertown could be conducted with the existing FEMA hydrologic and hydraulic models using the Big Sioux River inflows from our analysis. Inclusion of the Lake Kampeska storage in the analysis would only further reduce the peak flows through Watertown. Therefore, the conclusions presented in the Comprehensive Water Resource Management Plan for the Big Sioux River Headwaters Area on percent flow reductions would be verified and the percent reduction would be even more improved.

Further, the water level in the Lake is largely dependent on the flows in the Big Sioux River. The new outlet at Lake Kampeska will only hold back flows in the river to approximately 6 inches of depth before the structure would overtop and river flows would pass into Lake Kampeska. So with the river is at its normal elevation before the 100-year storm occurs, at most the water elevation in Lake Kampeska at the time the 100-year event would occur, would be 6 inches higher than the river's elevation.

The modeling clearly shows that the peak discharge in the river just upstream of Lake Kampeska can be dramatically reduced to 25 percent of what currently would occur without the planned improvements. Because the vast majority of the total watershed flows to Lake Kampeska is through the Big Sioux River at the boundary of the Lake Pelican Water Project District, the stage or elevation of the lake is dependent upon the flows from the Big Sioux River. If the peak flows upstream of the lake can be dramatically reduced to 25 percent of what would occur without improvements, it doesn't take an extensive study to know that the flood impact on the lake and further downstream would subsequently be reduced. However, if Mr. Haffke is presuming that the lake stage of Lake Kampeska at the start of a 100-year storm is significantly higher than its high water overflow elevation, then Mr. Haffke is assuming a probability of occurrence condition significantly more severe than a 1 percent change of occurrence (a 100-year storm event occurrence interval). But regardless of where the level of Lake Kampeska is, the flood impact on Lake Kampeska and Watertown would be dramatically less than what currently occurs, and this can be easily analyzed by simply expanding the District's model to include Lake Kampeska or by inserting the inflows from our analysis into the FEMA models upstream of Kampeska and through Watertown. Surely nothing that was done to date would have to be redone and none of the modeling to date is seriously flawed.

Once you have had a chance to review this letter, you may wish to forward it to the U.S. Army Corps of Engineers and Mr. Haffke in follow-up to their letter. If you have any questions pertaining to this letter, please contact me directly at 952.832-2809.

Sincerely,

Steven M. Klein, P.E., P.H.
Vice President