Appendix E

Stream Reach Descriptions

July 12, 2006

MEAD & HUNT
Designing the future

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Subject: Deadmans Run Fluvial Geomorphology
July 13, 2006 Progress Meeting

In accordance with your request, Mead & Hunt, Inc. is pleased to present a summary of our fluvial geomorphic observations of Deadmans Run

This letter and the attached draft appendices will be reviewed during our project progress meeting with the city of Lincoln and the Lower Platte South Natural Resources District on July 13, 2006. Further, this letter, draft shapefiles, and photographs generated during my field work during the period of June 7 through June 12, 2006 and sent to your ftp site, will supplement our discussion on July 13.

Deadmans Run Geomorphic Observations

The approach for assessing the fluvial geomorphology of these unlined reaches was similar to that used for Steven's Creek. This included assessing the geomorphic indicators and processes and recording those observations using ArcPad Version 7.0. Our interpretations follow.

Sycamore Drive to Skyway Road Main Stem:

The creek along this reach is primarily a trapezoidal channel with turf grass-covered banks. Medium-sized trees are along the left descending bank crest and more brushy-type woody vegetation is near the crest along the right descending bank crest. The nominal flow at the bottom of the channel is from flow overtopping and leaking through the stoplog weir located immediately upstream of the Sycamore Drive crossing and potentially from groundwater base flow. Rushes line the edges of, and are growing in, the bottom channel at several locations, indicating a typical low energy waterway.

Evidence of incision and active meandering as seen in the historical aerial photographs were not observed. The 6- to 8-inch diameter pieces of crushed limestone in the channel have apparently abated incision since repairs to the banks and channel. However, current practices of mowing the shallow-rooted grass as close as possible to the waters edge (including rushes) and close to the ground have seriously reduced the potential of filtering surface water before it reaches the channel and of the roots reinforcing the banks. Several areas of the banks were scalloped to bare ground, thus eliminating the potential for the turf grasses from reinforcing the near surface and providing a stormwater buffer. The combination of shallow-rooted grasses along the banks and current mowing practice may have initiated the bank instabilities in the past.

Wedgewood Lake to Corporate Drive Tributary:
From the spillway for Wedgewood Lake to the pedestrian bridge for the trail, this tributary is reasonably stable with a two-stage channel and good bank reinforcement from existing woody vegetation. There is a knick point at the end of the concrete slab leading from the spillway but the tributary appears to have adjusted to the grade change and large broken slabs of concrete armor the bottom.

Downstream of the pedestrian bridge, the tributary is wider and appears to form a backwater condition upstream of the Corporate Drive crossing. Erosion is not a factor for this portion of this reach and sedimentation is less of a concern because of the limited sediment source along the banks and the upstream sediment sink of Wedgewood Lake. The main limiting factor for this portion of the reach is the narrow vegetative buffers along either side of the tributary. Algae and duckweed was of limited presence but the potential for both thriving following the loading of nutrient-rich surface waters flowing to the tributary was apparent.

Cornhusker Highway to Salt Creek Confluence Main Stem:
The sheetpile wall located near the Cornhusker Highway crossing and at the end of the lined trapezoidal channel remains an effective grade control, abating migration of the headcut upstream. The scour pool downstream of the sheetpile wall appears to have sized itself accordingly to the drop and flow from the sheetpile wall. Immediately downstream of the sheetpile wall is a 48-inch corrugated metal pipe (CMP) along the left descending bank. The flow during rainfall events from this outfall appears to direct the flow of the main stem over to the right descending bank resulting in localized scour along this bank. This directing of flow also appears to set up the meandering form, such that the left descending bank shows erosion downstream.

The erosion remains along the left descending bank for approximately half the distance between the sheetpile wall and the confluence with Salt Creek. Perhaps the right descending bank does not show as much scour because it was regraded. The creek is undergoing active re-meandering from the previously-mentioned 48-inch CMP and the destroyed 36-inch CMP along the left descending bank.

When the 36-inch CMP was installed, more than likely the outside bend of the meander was along the right descending bank. During higher flows which overtopped the CMP outlet frame, the bank behind the frame scoured, exposing the fine glacial outwash sand, which underlies the loess. The overtopped pipe became a flow vane, directing the flow perpendicular to the pipe alignment. Water flows over the pipe until the sand is eroded under the pipe and the undermined pipe collapses. This sequence is repeated along the inclined pipe and the erosion migrates to the left bank. The outside bend of the meander makes a phase change to the left bank and assists in setting up re-meandering process between the two CMP outfalls.

Downstream of the 36-inch CMP, localized bank degradation is observed opposite of two outfalls, where the flows of which have acted as turning vanes. Sedimentation through bar deposition is prevalent along the whole unlined portion of this reach. The bars within the re-meandering segment are irregular, which would be expected. Downstream of the 36-inch CMP, the bars become somewhat more regular-shaped. Closer to the confluence with Salt Creek, submerged ripples and megaripples of sand along the channel bottom are prevalent.