



TECHNICAL MEMORANDUM

Date: December 3, 2015
To: Roger Dane
From: Scott Stoneman, PE
cc: Jim Johnson, LG, LEG
Project No.: 14-03741-12
Company: City of Redmond
Email: sstoneman@golder.com
RE: SMITH WOODS PARK – POND EMBANKMENT INSPECTION

The City of Redmond (City) recently completed a stream reconnaissance of Monticello Creek. An embankment for a small pond within Smith Woods Park (an undeveloped neighborhood park managed by the City of Redmond Parks Department) was identified as a potential risk. The City reported that flow did not appear to be exiting the pond through the outlet riser pipe; however, there were two sink holes along what was thought to be the alignment of outlet pipe. A second issue identified was the top of the berm appeared to have eroded near the spillway.

The City of Redmond asked Golder to visit the site; provide Roger Dane with a brief general assessment of risks and conduct a follow-up site meeting with a larger group of City staff to discuss our findings. If immediate action was needed, Golder was instructed to provide a list of alternative solutions.

On Monday, November 9, 2015, Scott Stoneman, PE and Brandan Vavrek, PE of Golder visited the Smith Woods Park pond. The pond was observed to have an embankment approximately 8 feet in height, and just over 100 feet in length. The principal outlet of the pond was an approximately 12-inch riser pipe connected to a 12-inch outlet pipe. This riser pipe was capped with a corrugated metal inlet pipe, mitered at a 45 degree angle at the top to create a sloping inlet with metal bars as a trash rack. The riser pipe invert elevation appeared to be approximately equal to the emergency spillway elevation, which is unusual as riser inlets are typically lower than the emergency spillway. The pond was estimated to impound about 2 to 4 acre-feet of water. The emergency spillway consisted of a small concrete pad, about 2.5 feet wide (perpendicular to flow) only on the level portion of the top of the embankment. Some of the critical issues observed regarding the small dam embankment are as follows:

- Two sink holes along the outlet pipe alignment to a depth near the expected location of outlet pipe, one about 7-feet in diameter near the crest and one about 3-feet in diameter just upslope of the outlet, indicating piping and failure of the outlet pipe. Flow was observed in the bottom of the larger sink hole. The outlet of pipe appeared to be damaged and failing. However, the water in the channel downstream of the pond was not turbid and was mostly clear.
- Water was overtopping the embankment and flowing through and around the concrete emergency spillway, creating a 2-foot deep head cut near the crest of the dam, with only about 3 feet of unarmored embankment width between the head cut and the pond.



- Golder probed the soil along the dam embankment. The probe could be pushed into the soil up to the full length of the probe (approximately 3 feet) into the embankment at many locations indicating the embankment soils are soft. Numerous soft and wet spots were noted along the embankment.

Golder recommended to first lower the water level in the pond by at least 2 to 4 feet as soon as possible by pumping or siphoning water to downstream of the dam. This reduction in pool level would prevent water from flowing into the intake, would significantly reduce the volume of water impounded, reduce the head acting on any seepage through the embankment, and significantly reduce the risk of failure. After the pool level was lowered, Golder also recommended maintaining the lowered water level until permanent repairs could be completed. To maintain the lowered water level, Golder recommended the City excavate a notch through embankment adjacent to the existing emergency spillway down to the base of the prior head cut. Temporary erosion protection was also recommended to be installed on the flow path down to the stable channel (approximately 30 feet).

On Thursday, November 12, 2015, Golder later met with Roger Dane and City Parks Department and presented our findings and recommendations. The Parks Department was in agreement and the City immediately began work on lowering the water surface.

On Friday, November 13, 2015, Scott Stoneman visited the site. The City had followed the recommendations provided by Golder. The water level was lowered by approximately 3 feet below the pool level observed on November 9. A new temporary spillway was hand-excavated, adjacent to the existing emergency spillway concrete pad, down to the base of the prior head cut, and plastic lined to the downstream end of the embankment.

Golder recommends that the City regularly monitor the pond embankment and temporary spillway for changes (e.g. changes in sinkholes, increased/turbid seepage through the embankment, erosion of the temporary spillway, etc.), particularly during and after significant precipitation events, until permanent repairs are completed.

We appreciate the opportunity to work with the City of Redmond on this exciting project and look forward to continuing to support you on this project and throughout our community.

GOLDER ASSOCIATES INC.



Scott Stoneman, PE
Senior Engineer

SS/JJ/tp



James G. Johnson, LG, LEG
Principal