



June 5, 2017

Reference No. 11138886

Via Electronic Mail

Ms. Reva K. Berger, President
Cross Creek Homeowners Association
1559 Riverdale Drive
Oldsmar, Florida 34677

Dear Ms. Berger:

**Re: Results of Visual Assessment and Shallow Subsurface Exploration
Cross Creek Stormwater Ponds – Bank Erosion
Eastlake Woodlands
Oldsmar, Pinellas County, Florida**

1. Introduction

GHD has completed a visual assessment and shallow subsurface exploration at the subject project. The purpose of these services was to identify the existing subsurface, (soil and groundwater) conditions along the affected areas of the pond banks and to provide recommendations for remediation. It is our understanding that the banks of both the north and south ponds have shown signs of erosion over the last several years. The most severe areas appeared to be along the southeastern sides of both ponds. In 2015 the southwestern bank of the south pond was remediated with the installation of a Geoweb slope protection system. We also understand that aquatic plants were introduced and a “no mow zone” was established around the perimeter of both ponds.

2. Visual Assessment and Soil Boring Results

The existing banks were showing signs of erosion and soil loss into the ponds, primarily along the southeastern edges of both the north and south ponds. We performed a total of four hand auger borings in these areas, as shown on the attached **Figures 1 and 2**.

The borings primarily encountered slightly silty and silty fine sands to the depths explored, about 3-1/2 to 4-1/2 feet. A clayey fine sand was encountered in boring AB-1 between 4 and 4-1/2 feet. The groundwater level was recorded at depths ranging from approximately 2.6 to 4.1 feet below the existing grade at the boring locations. Detailed results of the borings are presented on the attached **Boring Logs**.

3. Recommendations and Cost Estimate

The erosion along a pond bank is a common occurrence and is caused by several factors, including sheet flow of stormwater that transports surface soils down slope and into the ponds, lack of vegetation and root systems which can help to hold the soils in place, and wave action on the pond banks, among others.



There are several engineering techniques available to reduce and prevent pond bank erosion. The placement of the Geoweb and pine bark stone along the southwestern bank of the southern pond is a good example of one of these techniques. It is our experience; however, that one of the most economical methods of treating pond bank erosion is to simply place a well-graded rip-rap along the affected slopes. In order to do this properly, the water level in the ponds should be low enough to expose the toe of the slope at the bottom of the pond, which appears to be several feet below the current water level. The affected slopes should then be re-graded to create a uniform slope and the slope should be made as minimal as possible, considering the geometry of the top and bottom of banks. Next, a heavy duty filter fabric should be placed along the slopes and anchored as necessary at the top and bottom of the slope to prevent sliding. Finally, the rip-rap can be placed along the slope. The rip-rap should be well-graded with a size range of around 8 to 18 inches.

In order to arrive at a cost estimate, we used a horizontal distance of the most affected areas of approximately 120 feet and 175 feet for the north and south ponds, respectively. We also used a distance from the top of the slope to the bottom of the slope of about 10 feet. Based on these distances, we estimate the cost to treat both of these areas be in the range of about \$50,000.00 to \$55,000.00 if the pond water level does not need to be lowered. If the rip-rap is placed at a time when the pond water level needs to be lowered, it may cost an additional \$20,000.00 to pump the pond water level down temporarily.

GHD is pleased to have the opportunity to submit this letter. Should you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

GHD

Florida Engineering Business No. 9931
Local Address: 5904 Hampton Oaks Parkway Suite F Tampa FL 33610 USA

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and the signature must be verified on any electronic copies.



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by John C Phillips
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John C. Phillips, P.E.
Senior Geotechnical Engineer
Florida P.E. License No.: 47586

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Encl. Figures 1 and 2
Soil Boring Logs