

Date November 27, 2012

To Chisago Lakes Lake Improvement District Board of Managers

cc Jerry Spetzman

From Greg D. Graske, P.E.

Regarding Soil Borings at North Center Outlet

The purpose of this memo to provide a summary of soil borings taken at the outlet of North Center Lake. The purpose of these borings is to try to determine a historical channel elevation through this channel and determine if the existing materials at the outlet are naturally occurring or fill.

Background

American Engineering Testing conducted soil borings near the proposed flowage excavation for North Center Lake on November 9, 2012. Five geo-probe borings were advanced to a depth of 7-8 feet each. Soils were classified and logged by a Professional Geologist.

Soil borings were conducted along the western shore of North Center Lake by the North Center Lake – North Lindstrom Lake Channel Flowage. The objective was to identify the thickness of recent fill and organic material in the channel.

Jerry Spetzman (Chisago County) and Al Wahlgren (Board Manager) were onsite to observe the borings. Borings were conducted by American Engineering Testing using a Geoprobe. Stuart Grubb (EOR) selected the boring locations and completed boring logs.

Boring logs and a map showing boring locations and elevations are attached. At each boring location, 21 inches or less of recently deposited material was present. These materials consisted of sand and gravel with some plant material. The origin of the sand and gravel was not readily apparent. Some possible origins were:

- Fill material placed in the channel
- Sand and gravel washed off the adjacent road
- Natural channel bottom sediments.

Below the recently deposited material was a brown silty clay till, or glacial deposits. This is consistent with the surficial geology map in the Chisago County Geologic Atlas, which shows loamy till in the area described as:

Loamy till (low relief)—Chiefly loam-textured, unsorted sediment (diamicton); pebbly, with scattered cobbles and rare boulders. Lenses of stratified sediment are uncommon in most areas. Includes sediment both deposited beneath active ice and on stagnant ice. Generally more than 20 feet (6 meters) thick over the Cromwell Formation. Commonly water-washed and overlain in places by a few feet (1 meter) of lacustrine, fluvial, or eolian sand...

Summary

The soil borings located in line with the existing channel (borings 1-3) indicate between 9-22-inches of material over native Loamy till in the channel. Results of the testing indicate that the historic channel outlet elevation may have been somewhere between 894.95 and 895.65.

Attachments:

-Soil Boring Location Map

-Soil Boring Log

Date: 11/27/2012 Time: 11:37:43 AM Author: ejensen Document Path: X:\Clients_County\00969_Chicago_Lakes_Improvement_District\0025_CLLID_EAW_Center_L_in\distrom_Channel109_GIMS_ProjectName\GISRM_EAW_borings.mxd



Legend

- Soil Boring with elevation of clay till
- Channel Alignment

CLLID: Preliminary Feasibility Channel Restoration

Soil Borings



Figure 1



651 Hale Ave N.
 Oakdale, MN
 (651) 770-8448
 Fax: (651) 770-2552

Project: Chisago Lakes LID
 Location: North Center Lake
 Date: 11/9/2012
 Boring Number: SB-1

Depth (ft)	Soil Boring Log	Sample recovery (%)	Sample no., type, interval		
1	0-3" Brown medium SAND and gravel.	100	1 Core 0-4 ft		
	Brown silty CLAY				
2	Brown silty CLAY Till with pebbles				
3					
4	Gray silty CLAY Till with pebbles. Very stiff				
5		100	2 Core 4-8 ft		
6					
7					
8	End of boring				
GW Level:	Sheet 1 of 1	Start 9:45	Finish 11:45		
Driller	Logged by SEG	Landowner	File: CS LID\Soil borings		
Drill type Geoprobe	Contractor AET	Elev.: Surf 896.347	T.O.C.		

Notes:



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Project: Chisago Lakes LID
 Location: North Center Lake
 Date: 11/9/2012
 Boring Number: SB-2

Depth (ft)	Soil Boring Log	Sample recovery (%)	Sample no., type, interval		
1	0-9" Brown medium SAND and gravel. Roots and organic material.	100	1 Core 0-4 ft		
	Brown sandy CLAY Till. Dry.				
2					
3					
4					
5		100	2 Core 4-7 ft		
6	Gray silty CLAY Till with pebbles.				
7					
8	End of boring				
GW Level:		Sheet 1 of 1		Start 9:45	Finish 11:45
Driller		Logged by SEG		Landowner	File: CS LID\Soil borings
Drill type Geoprobe		Contractor AET		Elev.: Surf 896.395	T.O.C.

Notes:



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Project: Chisago Lakes LID
 Location: North Center Lake
 Date: 11/9/2012
 Boring Number: SB-3

Depth (ft)	Soil Boring Log	Sample recovery (%)	Sample no., type, interval		
1	Sand and gravel, organic material	60	1 Core 0-4 ft		
	3 - 21" Brown medium SAND with gravel				
2	Gray silty CLAY Till. Stiff.				
3					
4					
5		100	2 Core 4-7 ft		
6					
7					
8	End of boring				
GW Level:		Sheet 1 of 1		Start 9:45 Finish 11:45	
Driller		Logged by SEG		Landowner File: CS LID\Soil borings	
Drill type Geoprobe		Contractor AET		Elev.: Surf 896.704 T.O.C.	

Notes:



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Project: Chisago Lakes LID
 Location: North Center Lake
 Date: 11/9/2012
 Boring Number: SB-4

Depth (ft)	Soil Boring Log	Sample recovery (%)	Sample no., type, interval		
1	0-9" Brown medium SAND and gravel. Loose.	100	1 Core 0-4 ft		
	Brown silty CLAY Till with pebbles				
2					
3					
4					
5	4.5 - 5.5' VERTICAL sand "seam" in half of sample	100	2 Core 4-7 ft		
	Bright red oxidized pebble				
6					
7					
8	End of boring				
GW Level:		Sheet 1 of 1	Start 9:45	Finish 11:45	
Driller		Logged by SEG	Landowner		File: CS LID\Soil borings
Drill type Geoprobe	Contractor AET	Elev.: Surf	897.553	T.O.C.	

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Project: Chisago Lakes LID
 Location: North Center Lake
 Date: 11/9/2012
 Boring Number: SB-5

Depth (ft)	Soil Boring Log	Sample recovery (%)	Sample no., type, interval		
1	0-12" Brown medium SAND (Fill?)	90	1 Core 0-4 ft		
2	Brown silty CLAY Till with pebbles				
3	Light brown 1-inch sand seam				
4					
5	1.5-inch gray medium sand seam	100	2 Core 4-7 ft		
6	Red oxidized pebble				
7					
8	End of boring				
GW Level:		Sheet 1 of 1		Start 9:45	Finish 11:45
Driller		Logged by SEG		Landowner	File: CS LID\Soil borings
Drill type Geoprobe		Contractor AET		Elev.: Surf 896.703	T.O.C.

Notes: