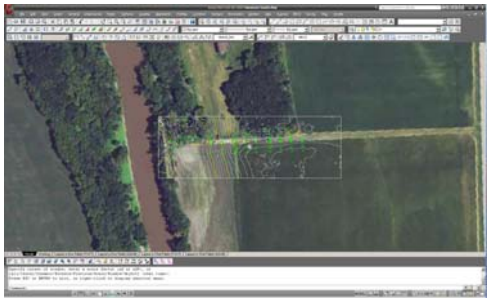
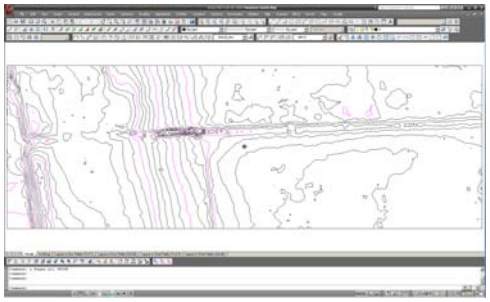
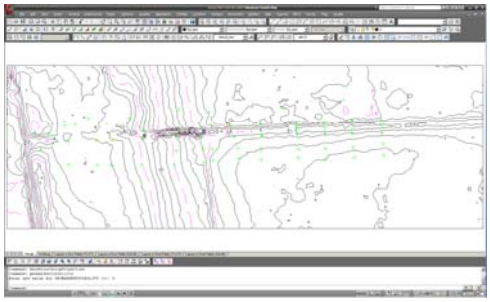
Some trees and open field



LiDAR Surface



80 points surveyed with VRS



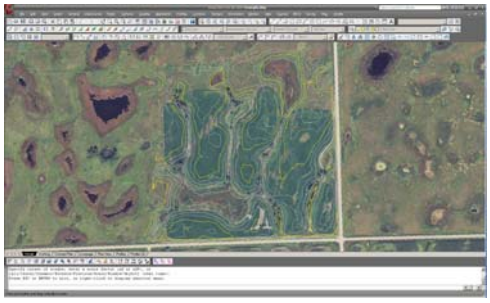
Summary of Comparison

Difference in Elevation between Survey Points and the LiDAR Surface created in Civil3D

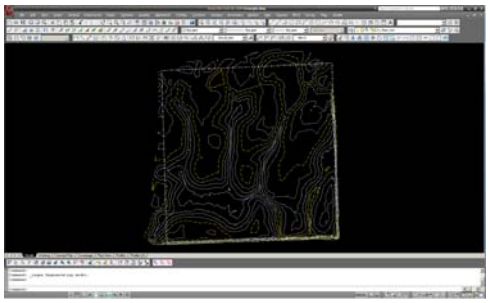
GS - Open Areas, Worked Field, Heavy Biome	GS - Tree Cover	Ditch Banks - Some Tree Cover	Ditch Banks - Heavy Tree Cover	GS - Tree Cover, Possible Sedimentation	Ditch - Centerline
0	0	0	0.4	0.1	0.2
0	0.1	0	0.6	0.1	0.2
0	0.1	0.1	0.8	0.2	0.2
0	0.1	0.1	1	0.4	0.3
0	0.1	0.1	1.4	0.7	0.5
0	0.2	0.2		0.8	0.8
0.1	0.3	0.2		0.9	1.4
0.1	0.4	0.2		1.8	1.7
0.1	0.4	0.2		2.6	2.4
0.1	0.4	0.3			
0.1	0.8	0.3			
0.1		0.3			
0.1		0.3			
0.1		0.3			
0.1		0.4			
0.2		0.5			
0.2		0.6			
0.2		0.7			
0.2		0.9			
0.2					
0.3					
0.5					
Average Difference	Average Difference	Average Difference	Average Difference	Average Difference	Average Difference
0.1	0.3	0.3	0.8	0.8	0.9

90% < 0.2’ 90% < 0.3’ ** 2 years between surveys **

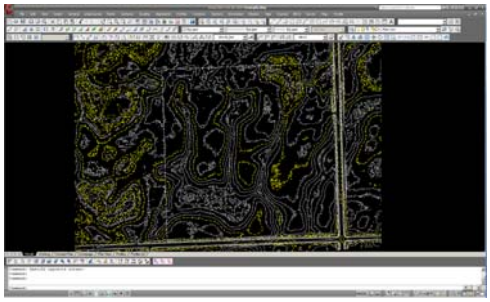
Open Field, Heavy Cattails



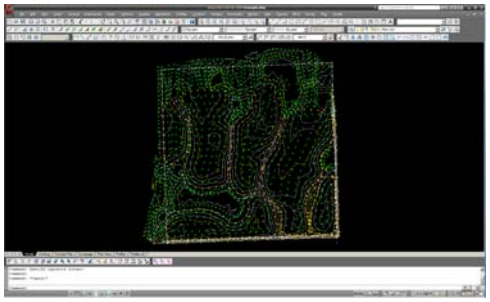
Surface from VRS Field Survey



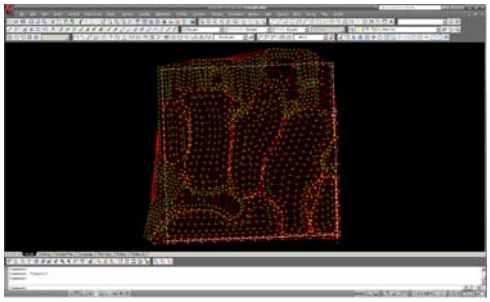
LiDAR Surface



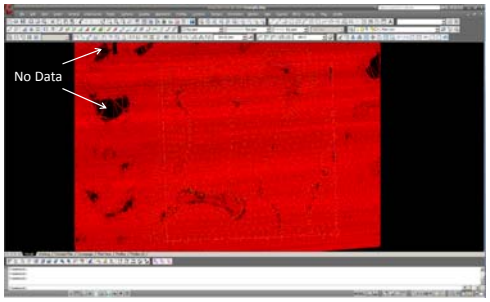
VRS Survey Points



TIN Lines with VRS Survey



TIN Lines with LiDAR



Summary of Comparison

- 0.1' to 0.2' difference between the surfaces. LiDAR was consistently higher in this example.
- Original survey was not calibrated to local benchmarks. (Typically within hundredths' using VRS without calibration)
- Low areas with standing water? LiDAR acquired April – May 2008 in this area.
- Heavy vegetation?
- Error in LiDAR or Field Survey?

From what I've experienced…

- Detailed survey of structure locations, outlets, ditches, property lines, low areas with ponding or heavy vegetation, is and always will be required.
- If using LiDAR along with a field survey make sure your tied to the same vertical datum.
- To obtain the best vertical control using VRS
  - Check control
  - Site calibration (MNDOT Benchmarks)
  - Use mount point NAD83(NSRS2007) with geoid 09