Johnston County, Neuse Basin

The preliminary checkpoint spreadsheets were received from NCGS on March 1, 2002. Two spreadsheets were included which compared the independent QA/QC survey checkpoints with the interpolated LIDAR "Z" value as provided by the contractors. The spreadsheet summaries included:

1. All the checkpoints with the RMSE calculation for combined land cover
2. 95% of the checkpoints with the RMSE calculation (5% of points having the largest error removed)

All data was reviewed and further analyzed to assess the quality of the data. The review process examined the statistics for the combined land cover and the trends for each specific land cover type. The following graphs and figures illustrate the data quality as per the RMSE criteria.

Table 1 summarizes the RMSE using:

- 100% of the checkpoints
- 95% of the checkpoints
- Checkpoints categorized by land cover type

Table 1. RMSE by Land Class

%	RMSE (cm)	# of Points	Land Class	RMSE Criteria (cm)
100	20.5	224	All	
95	**14.6**	**213**	**All**	**25**
19	10.9	43	Grass	
19	13.6	43	Weeds/Crop	
15	18.9	34	Scrub	
21	16.2	47	Forest	
21	13.1	46	Built-up	

The LIDAR data for Johnston County, Neuse Basin meets the specification as per the RMSE criteria of 25 cm.

All figures represent the data with the 95% data set. The data is of good quality.

Figure 1 illustrates the RMSE by specific land cover type.

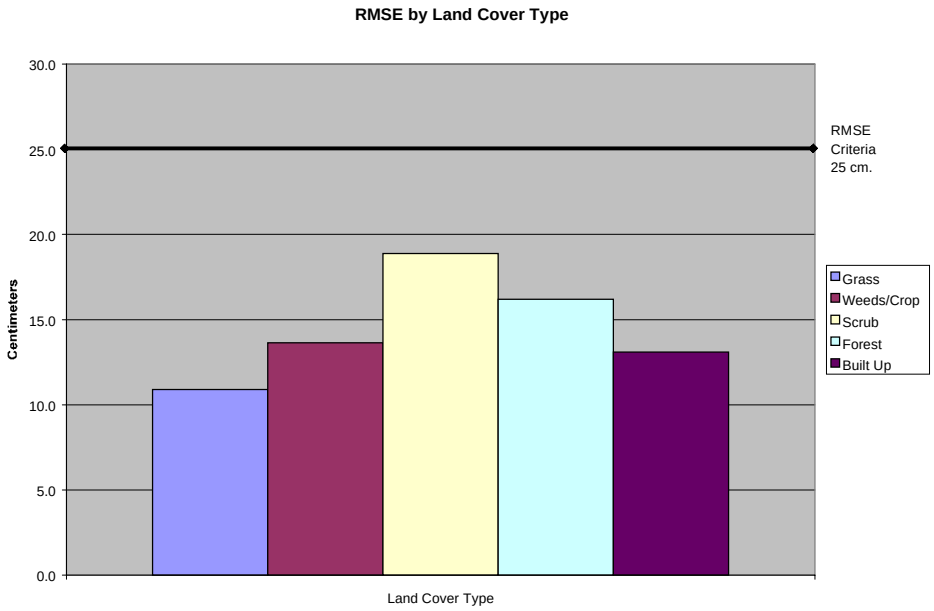

Figure 1

Figure 2 illustrates the magnitude of the differences between the checkpoints and LIDAR data by specific land cover type and sorted from lowest to highest.

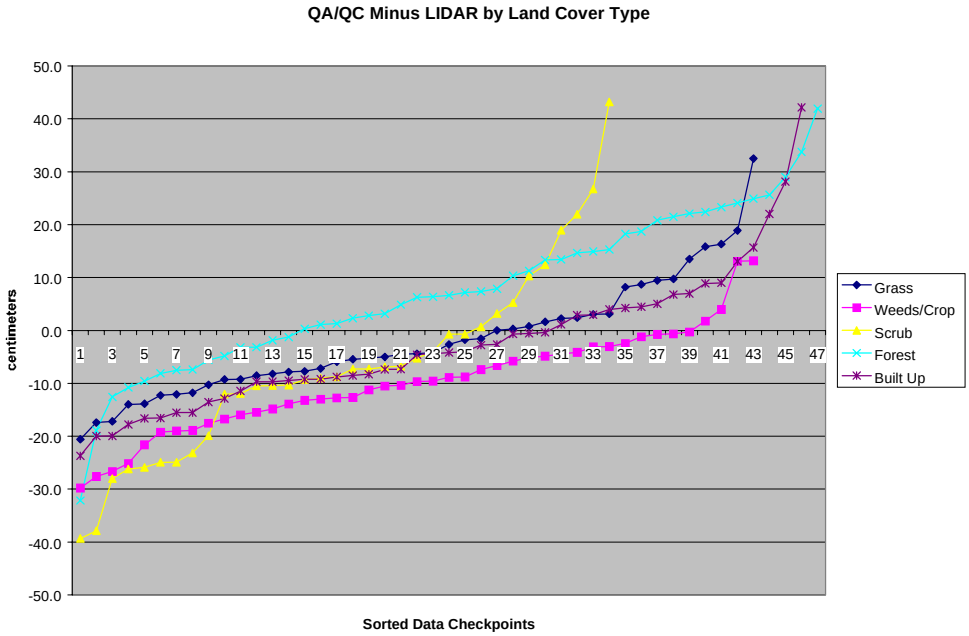

Figure 2

Table 2 illustrates the Delta between the QA/QC survey checkpoints and that of the interpolated LIDAR.

Table 2. Elevation Delta	
Delta (cm)	**Land Cover**
-20.6	Grass
-17.4	Grass
-17.2	Grass
-14.0	Grass
-13.9	Grass
-12.3	Grass
-12.1	Grass
-11.8	Grass
-10.3	Grass
-9.3	Grass
-9.3	Grass
-8.6	Grass
-8.2	Grass
-7.9	Grass
-7.7	Grass
-7.2	Grass
-5.9	Grass
-5.5	Grass
-5.3	Grass
-5.0	Grass
-4.5	Grass
-4.4	Grass
-4.2	Grass
-2.7	Grass
-1.8	Grass
-1.6	Grass
0.0	Grass
0.3	Grass
0.8	Grass
1.6	Grass
2.3	Grass
2.4	Grass
3.0	Grass
3.1	Grass
8.2	Grass
8.7	Grass
9.4	Grass
9.7	Grass
13.5	Grass
15.8	Grass
16.3	Grass
18.9	Grass
32.5	Grass
-29.8	Weeds/Crop
-27.6	Weeds/Crop
-26.6	Weeds/Crop
-25.2	Weeds/Crop
-21.6	Weeds/Crop
-19.2	Weeds/Crop
-19.0	Weeds/Crop
-18.9	Weeds/Crop
-17.6	Weeds/Crop
-16.7	Weeds/Crop
-16.0	Weeds/Crop
-15.5	Weeds/Crop
-14.8	Weeds/Crop
-13.9	Weeds/Crop
-13.2	Weeds/Crop
-13.0	Weeds/Crop
-12.7	Weeds/Crop
-12.7	Weeds/Crop
-11.3	Weeds/Crop
-10.5	Weeds/Crop
-10.4	Weeds/Crop
-9.7	Weeds/Crop
-9.6	Weeds/Crop
-8.9	Weeds/Crop
-8.8	Weeds/Crop
-7.4	Weeds/Crop
-6.6	Weeds/Crop
-5.8	Weeds/Crop
-5.1	Weeds/Crop
-4.8	Weeds/Crop
-4.5	Weeds/Crop
-4.1	Weeds/Crop
-3.1	Weeds/Crop
-3.0	Weeds/Crop
-2.5	Weeds/Crop
-1.2	Weeds/Crop
-0.7	Weeds/Crop
-0.6	Weeds/Crop
-0.3	Weeds/Crop
1.8	Weeds/Crop
4.0	Weeds/Crop
13.1	Weeds/Crop
13.2	Weeds/Crop
-39.3	Scrub
-37.9	Scrub
-28.0	Scrub
-26.2	Scrub
-25.9	Scrub
-24.9	Scrub
-24.9	Scrub
-23.2	Scrub
-19.9	Scrub
-12.1	Scrub
-12.0	Scrub
-10.5	Scrub
-10.4	Scrub
-10.3	Scrub
-9.3	Scrub
-9.0	Scrub
-8.8	Scrub
-7.3	Scrub
-7.3	Scrub
-6.9	Scrub
-6.8	Scrub
-5.3	Scrub
-4.0	Scrub
-0.7	Scrub
-0.7	Scrub
0.7	Scrub
3.2	Scrub
5.2	Scrub
10.3	Scrub
12.4	Scrub
18.9	Scrub
22.0	Scrub
26.7	Scrub
43.2	Scrub
-32.2	Forest
-19.0	Forest
-12.6	Forest
-10.8	Forest
-9.6	Forest
-8.1	Forest
-7.5	Forest

-7.4	Forest
-5.6	Forest
-4.8	Forest
-3.2	Forest
-3.2	Forest
-1.8	Forest
-1.3	Forest
0.3	Forest
1.1	Forest
1.3	Forest
2.3	Forest
2.8	Forest
3.1	Forest
4.9	Forest
6.3	Forest
6.4	Forest
6.6	Forest
7.2	Forest
7.4	Forest
7.9	Forest
10.3	Forest
11.3	Forest
13.3	Forest
13.4	Forest
14.7	Forest
14.9	Forest
15.3	Forest
18.2	Forest
18.7	Forest

20.8	Forest
21.5	Forest
22.1	Forest
22.4	Forest
23.3	Forest
24.1	Forest
24.9	Forest
25.6	Forest
29.0	Forest
33.7	Forest
41.9	Forest
-23.7	Built-up
-20.0	Built-up
-20.0	Built-up
-17.8	Built-up
-16.6	Built-up
-16.6	Built-up
-15.5	Built-up
-15.5	Built-up
-13.5	Built-up
-12.9	Built-up
-11.4	Built-up
-9.7	Built-up
-9.7	Built-up
-9.5	Built-up
-9.3	Built-up
-9.2	Built-up
-8.8	Built-up
-8.5	Built-up

-8.3	Built-up
-7.4	Built-up
-7.3	Built-up
-4.6	Built-up
-4.4	Built-up
-4.2	Built-up
-4.0	Built-up
-2.8	Built-up
-2.6	Built-up
-0.7	Built-up
-0.6	Built-up
-0.4	Built-up
1.1	Built-up
2.9	Built-up
2.9	Built-up
4.0	Built-up
4.2	Built-up
4.5	Built-up
5.0	Built-up
6.8	Built-up
7.0	Built-up
8.9	Built-up
9.0	Built-up
13.0	Built-up
15.7	Built-up
22.1	Built-up
28.1	Built-up
42.1	Built-up

Table 3 illustrates the overall statistics for the checkpoint data.

Table 3. Overall Descriptive Statistics

	RMSE (cm)	Mean (cm)	Median (cm)	Skew (cm)	Std Dev (cm)	# of Points	Min (cm)	Max (cm)
Total	**14.6**	-2.3	-4.4	0.5	14.4	213	-39.3	43.2
Grass	**10.9**	-1.9	-4.4	0.9	10.8	43	-20.6	32.5
Weeds/Crop	**13.6**	-9.8	-9.7	0.1	9.6	43	-29.8	13.2
Scrub	**18.9**	-6.7	-8.0	0.6	17.9	34	-39.3	43.2
Forest	**16.2**	7.4	6.6	-0.1	14.5	47	-32.2	41.9
Built Up	**13.1**	-2.6	-4.3	1.2	13.0	46	-23.7	42.1

Figure 3 illustrates a histogram of the associated delta errors between the data checkpoints and the interpolated TIN values.

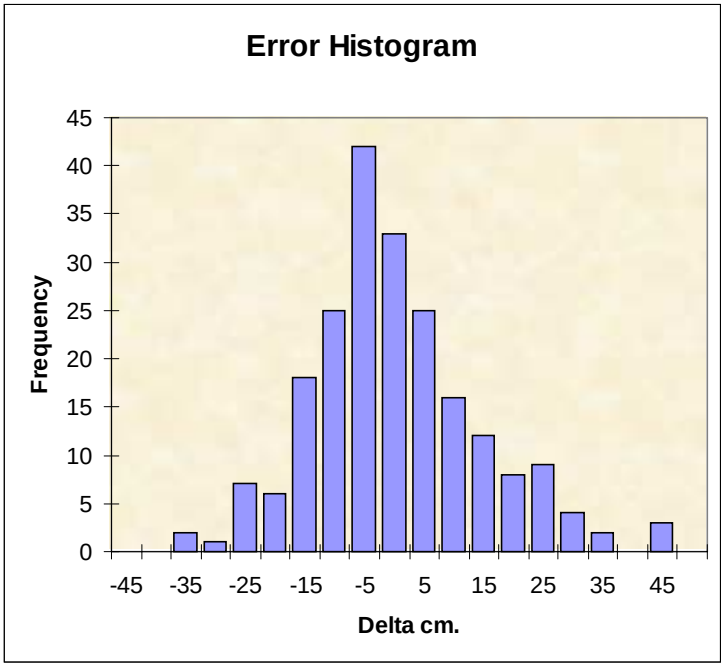

Figure 3