6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-4060	1C-2
Location and Surveys	

SURVEY CONTROL SHEET R-4060

GPS Calibration Report

Project : R4060

User name	rgmiller	**Date & Time**	11:48:56 AM 3/5/03
Coordinate System	US State Plane 1983(at ground)	**Zone**	North Carolina 3200
Project Datum	NAD 1983 (Conus)		
Vertical Datum	NAVD 88	**Geoid Model**	Geoid99 NC Sub Grid
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

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Datum Transformation Parameters
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Datum Transformation Parameters

Datum Transformation computation not requested

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Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

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Horizontal Adjustment Parameters

Northing coordinate of rotation center	1008002.157sft
Easting coordinate of rotation center	1375454.266sft
Rotation about the center point	0°00'00"
Translation north	0.006sft
Translation east	0.011sft
Scale factor	0.99999991

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Vertical Adjustment Parameters

Northing coordinate of origin point	993220.572sft
Easting coordinate of origin point	1360135.659sft
Vertical separation at origin	-0.004sft
Slope north	2.645ppm
Slope east	5.310ppm

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Geoid Model Definition

Geoid99 NC Sub Grid

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Residual Differences Between GPS And Known Coordinates

Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.015sft	0.003	V 87_GPS
Vertical	0.118sft	0.027	V 87_GPS
Three-dimensional	0.119sft	0.019	V 87_GPS

Point Residuals

GPS point		Calculated point		Control point	
Point	R4060-1_GPS	**Northing**	1008229.034sft	**Point**	R4060-1
Latitude	36°30'06.20405"N	**Easting**	1376039.802sft	**Northing**	1008229.031sft
Longitude	81°07'21.96357"W	**Elevation**	2820.019sft	**Easting**	1376039.799sft
Height	2715.207sft	**Horizontal error**	0.005sft	**Elevation**	?
		Vertical error	?	**Type**	Horizontal
		3D error	0.005sft	**Point quality**	Adjusted quality
Point	R4060-2_GPS	**Northing**	1007235.113sft	**Point**	R4060-2
Latitude	36°29'56.57124"N	**Easting**	1376947.627sft	**Northing**	1007235.111sft
Longitude	81°07'10.58873"W	**Elevation**	2795.988sft	**Easting**	1376947.623sft
Height	2691.125sft	**Horizontal error**	0.005sft	**Elevation**	?
		Vertical error	?	**Type**	Horizontal
		3D error	0.005sft	**Point quality**	Adjusted quality
Point	R4060-3_GPS	**Northing**	1004443.491sft	**Point**	R4060-3
Latitude	36°29'29.90241"N	**Easting**	1381348.259sft	**Northing**	1004443.493sft
Longitude	81°06'15.98647"W	**Elevation**	2867.227sft	**Easting**	1381348.263sft
Height	2762.150sft	**Horizontal error**	0.005sft	**Elevation**	?
		Vertical error	?	**Type**	Horizontal
		3D error	0.005sft	**Point quality**	Adjusted quality
Point	R4060-4_GPS	**Northing**	1003619.090sft	**Point**	R4060-4
Latitude	36°29'21.99012"N	**Easting**	1382478.816sft	**Northing**	1003619.096sft
Longitude	81°06'01.93258"W	**Elevation**	2903.159sft	**Easting**	1382478.819sft
Height	2798.023sft	**Horizontal error**	0.006sft	**Elevation**	?
		Vertical error	?	**Type**	Horizontal
		3D error	0.006sft	**Point quality**	Adjusted quality
Point	V 87_GPS	**Northing**	993220.572sft	**Point**	V 87
Latitude	36°27'34.44534"N	**Easting**	1360135.659sft	**Northing**	993220.565sft
Longitude	81°10'32.65583"W	**Elevation**	3034.646sft	**Easting**	1360135.646sft
Height	2930.079sft	**Horizontal error**	0.015sft	**Elevation**	3034.528sft
		Vertical error	0.118sft	**Type**	Horz and Vert
		3D error	0.119sft	**Point quality**	Control quality
Point	TURKEY_GPS	**Northing**	1028776.458sft	**Point**	TURKEY
Latitude	36°33'21.57739"N	**Easting**	1340519.438sft	**Northing**	1028776.452sft
Longitude	81°14'42.53635"W	**Elevation**	2905.564sft	**Easting**	1340519.437sft
Height	2802.018sft	**Horizontal error**	0.006sft	**Elevation**	2905.680sft
		Vertical error	0.116sft	**Type**	Horz and Vert
		3D error	0.116sft	**Point quality**	Control quality
Point	VA 11_GPS	**Northing**	1052529.762sft	**Point**	VA 11
Latitude	36°37'22.82300"N	**Easting**	1370097.765sft	**Northing**	1052529.766sft
Longitude	81°08'46.44303"W	**Elevation**	2684.655sft	**Easting**	1370097.777sft
Height	2580.600sft	**Horizontal error**	0.013sft	**Elevation**	2684.607sft
		Vertical error	0.047sft	**Type**	Horz and Vert
		3D error	0.049sft	**Point quality**	Control quality
Point	BRYANT RM 4_GPS	**Northing**	965963.778sft	**Point**	BRYANT RM 4
Latitude	36°23'16.59198"N	**Easting**	1416066.856sft	**Northing**	965963.786sft
Longitude	80°59'01.53496"W	**Elevation**	3099.019sft	**Easting**	1416066.857sft
Height	2991.451sft	**Horizontal error**	0.008sft	**Elevation**	3099.069sft
		Vertical error	0.049sft	**Type**	Horz and Vert
		3D error	0.050sft	**Point quality**	Control quality

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DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R4060-2" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 1007235.111(ft) EASTING: 1376947.623(ft) ELEVATION: 2795.85(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99997752
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R4060-2" TO -L- STATION 10+00.00 IS N 39°11'04" W 335.66'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*
2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/
   THE FILES TO BE FOUND ARE AS FOLLOWS:
   R4060_LS_GPSCALIB.HTML
   R4060_LS_CONTROL.TXT
   IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

© *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

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rgmiller