

# GPS Calibration Report

*Project : R1015*

<b>TIP Number</b>	R-1015	<b>Date &amp; Time</b>	4:17:50 PM 12/7/2010
<b>User name</b>	breigner	<b>Zone</b>	North Carolina 3200
<b>Coordinate System</b>	US State Plane 1983(at ground)	<b>Geoid Model</b>	G09NC
<b>Horizontal Datum</b>	calibration		
<b>Vertical Datum</b>	NGVD29		
<b>Coordinate Units</b>	US survey feet		
<b>Distance Units</b>	US survey feet		
<b>Height Units</b>	US survey feet		

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## LOCAL SITE INFORMATION

Localized around	Gateway
Latitude	34°52'56.87769"N
Longitude	76°54'21.39879"W
Site Scale Factor	1.0001025660
Height	-98.811sft

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The North Carolina Department of Transportation uses a **Localized Coordinate System** which is very similar to North Carolina Zone 3200 from which it is derived. **Please take care in utilizing these coordinates to eliminate confusion of the two systems.** This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

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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	420459.143sft
Easting coordinate of rotation center	2619572.046sft
Rotation about the center point	0°00'00"
Translation north	0.002sft
Translation east	-0.010sft
Scale factor	1.00000717

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## Vertical Adjustment Parameters

Northing coordinate of origin point	443544.477sft
Easting coordinate of origin point	2614708.561sft
Vertical separation at origin	1.069sft
Slope north	-8.235ppm
Slope east	-11.775ppm

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# Geoid Model Definition

G09NC

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## Residual Differences Between GPS (WGS84) And Local Coordinates

### Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.221sft	0.023	GATEWAY_GPS
Vertical	0.247sft	0.028	R1015-8_GPS
Three-dimensional	0.264sft	0.036	R1015-8_GPS

### Point Residuals

WGS84 Coordinates		Calculated point FOR DISPLAY ONLY		Local Coordinates	
<b>Point</b>	R1015-24_GPS	<b>Northing</b>	443544.477sft	<b>Point</b>	R1015-24
<b>Latitude</b>	34°57'04.51218"N	<b>Easting</b>	2614708.561sft	<b>Northing</b>	443544.507sft
<b>Longitude</b>	76°56'54.20322"W	<b>Elevation</b>	29.646sft	<b>Easting</b>	2614708.497sft
<b>Height</b>	-94.119sft	<b>Horz error</b>	0.070sft	<b>Elevation</b>	29.695sft
		<b>Vert error</b>	0.049sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.085sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-22_GPS	<b>Northing</b>	438603.320sft	<b>Point</b>	R1015-22
<b>Latitude</b>	34°56'15.66428"N	<b>Easting</b>	2614639.180sft	<b>Northing</b>	438603.315sft
<b>Longitude</b>	76°56'56.26279"W	<b>Elevation</b>	28.741sft	<b>Easting</b>	2614639.166sft
<b>Height</b>	-95.064sft	<b>Horz error</b>	0.015sft	<b>Elevation</b>	28.720sft
		<b>Vert error</b>	0.020sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.025sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-21_GPS	<b>Northing</b>	437564.982sft	<b>Point</b>	R1015-21
<b>Latitude</b>	34°56'05.38574"N	<b>Easting</b>	2614691.199sft	<b>Northing</b>	437565.028sft
<b>Longitude</b>	76°56'55.89578"W	<b>Elevation</b>	27.215sft	<b>Easting</b>	2614691.173sft
<b>Height</b>	-96.598sft	<b>Horz error</b>	0.053sft	<b>Elevation</b>	27.257sft
		<b>Vert error</b>	0.042sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.068sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-19_GPS	<b>Northing</b>	433351.909sft	<b>Point</b>	R1015-19
<b>Latitude</b>	34°55'24.41893"N	<b>Easting</b>	2611277.935sft	<b>Northing</b>	433351.960sft
<b>Longitude</b>	76°57'37.92184"W	<b>Elevation</b>	29.444sft	<b>Easting</b>	2611277.952sft
<b>Height</b>	-94.434sft	<b>Horz error</b>	0.054sft	<b>Elevation</b>	29.245sft
		<b>Vert error</b>	0.199sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.206sft	<b>Quality</b>	Control quality
<b>Point</b>	PIZZA_GPS	<b>Northing</b>	430681.313sft	<b>Point</b>	PIZZA
<b>Latitude</b>	34°54'56.80804"N	<b>Easting</b>	2617165.113sft	<b>Northing</b>	430681.327sft
<b>Longitude</b>	76°56'27.90362"W	<b>Elevation</b>	29.709sft	<b>Easting</b>	2617165.113sft
<b>Height</b>	-94.141sft	<b>Horz error</b>	0.014sft	<b>Elevation</b>	29.744sft
		<b>Vert error</b>	0.035sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.038sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-17_GPS	<b>Northing</b>	427767.673sft	<b>Point</b>	R1015-17
<b>Latitude</b>	34°54'28.71561"N	<b>Easting</b>	2613644.753sft	<b>Northing</b>	427767.655sft
<b>Longitude</b>	76°57'10.88765"W	<b>Elevation</b>	32.527sft	<b>Easting</b>	2613644.824sft
<b>Height</b>	-91.388sft	<b>Horz error</b>	0.074sft	<b>Elevation</b>	32.480sft
		<b>Vert error</b>	0.046sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.087sft	<b>Quality</b>	Control quality

<b>Point</b>	R1015-18_GPS	<b>Northing</b>	427960.876sft	<b>Point</b>	R1015-18
<b>Latitude</b>	34°54'30.40062"N	<b>Easting</b>	2614749.711sft	<b>Northing</b>	427960.824sft
<b>Longitude</b>	76°56'57.57575"W	<b>Elevation</b>	31.155sft	<b>Easting</b>	2614749.735sft
<b>Height</b>	-92.748sft	<b>Horz error</b>	0.058sft	<b>Elevation</b>	31.181sft
		<b>Vert error</b>	0.026sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.063sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-16_GPS	<b>Northing</b>	421454.907sft	<b>Point</b>	R1015-16
<b>Latitude</b>	34°53'26.33522"N	<b>Easting</b>	2613421.606sft	<b>Northing</b>	421454.829sft
<b>Longitude</b>	76°57'15.12817"W	<b>Elevation</b>	31.544sft	<b>Easting</b>	2613421.655sft
<b>Height</b>	-92.449sft	<b>Horz error</b>	0.093sft	<b>Elevation</b>	31.663sft
		<b>Vert error</b>	0.119sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.151sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-15_GPS	<b>Northing</b>	420391.720sft	<b>Point</b>	R1015-15
<b>Latitude</b>	34°53'15.97487"N	<b>Easting</b>	2612668.832sft	<b>Northing</b>	420391.710sft
<b>Longitude</b>	76°57'24.42526"W	<b>Elevation</b>	31.265sft	<b>Easting</b>	2612668.824sft
<b>Height</b>	-92.747sft	<b>Horz error</b>	0.013sft	<b>Elevation</b>	31.224sft
		<b>Vert error</b>	0.041sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.043sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-11_GPS	<b>Northing</b>	418244.044sft	<b>Point</b>	R1015-11
<b>Latitude</b>	34°52'53.96050"N	<b>Easting</b>	2616471.187sft	<b>Northing</b>	418244.086sft
<b>Longitude</b>	76°56'39.32667"W	<b>Elevation</b>	22.165sft	<b>Easting</b>	2616471.214sft
<b>Height</b>	-101.855sft	<b>Horz error</b>	0.049sft	<b>Elevation</b>	22.083sft
		<b>Vert error</b>	0.081sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.095sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-12_GPS	<b>Northing</b>	418731.188sft	<b>Point</b>	R1015-12
<b>Latitude</b>	34°52'58.55313"N	<b>Easting</b>	2617567.093sft	<b>Northing</b>	418731.192sft
<b>Longitude</b>	76°56'26.05433"W	<b>Elevation</b>	22.969sft	<b>Easting</b>	2617567.092sft
<b>Height</b>	-101.036sft	<b>Horz error</b>	0.004sft	<b>Elevation</b>	22.907sft
		<b>Vert error</b>	0.062sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.062sft	<b>Quality</b>	Control quality
<b>Point</b>	GATEWAY_GPS	<b>Northing</b>	418778.073sft	<b>Point</b>	GATEWAY
<b>Latitude</b>	34°52'56.86767"N	<b>Easting</b>	2627954.431sft	<b>Northing</b>	418777.949sft
<b>Longitude</b>	76°54'21.39151"W	<b>Elevation</b>	23.965sft	<b>Easting</b>	2627954.249sft
<b>Height</b>	-99.963sft	<b>Horz error</b>	<b>0.221sft</b>	<b>Elevation</b>	23.999sft
		<b>Vert error</b>	<b>0.035sft</b>	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	<b>0.223sft</b>	<b>Quality</b>	Control quality
<b>Point</b>	R1015-10_GPS	<b>Northing</b>	415109.756sft	<b>Point</b>	R1015-10
<b>Latitude</b>	34°52'22.07046"N	<b>Easting</b>	2620829.267sft	<b>Northing</b>	415109.827sft
<b>Longitude</b>	76°55'47.81345"W	<b>Elevation</b>	24.105sft	<b>Easting</b>	2620829.290sft
<b>Height</b>	-99.940sft	<b>Horz error</b>	0.075sft	<b>Elevation</b>	24.193sft
		<b>Vert error</b>	0.088sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.115sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-9_GPS	<b>Northing</b>	414291.082sft	<b>Point</b>	R1015-9
<b>Latitude</b>	34°52'14.05457"N	<b>Easting</b>	2620442.138sft	<b>Northing</b>	414291.103sft
<b>Longitude</b>	76°55'52.66328"W	<b>Elevation</b>	25.767sft	<b>Easting</b>	2620442.181sft
<b>Height</b>	-98.294sft	<b>Horz error</b>	0.048sft	<b>Elevation</b>	25.751sft
		<b>Vert error</b>	0.015sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.050sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-7_GPS	<b>Northing</b>	411734.805sft	<b>Point</b>	R1015-7
<b>Latitude</b>	34°51'49.66443"N	<b>Easting</b>	2616116.175sft	<b>Northing</b>	411734.750sft
<b>Longitude</b>	76°56'45.20336"W	<b>Elevation</b>	27.575sft	<b>Easting</b>	2616116.191sft
<b>Height</b>	-96.550sft	<b>Horz error</b>	0.057sft	<b>Elevation</b>	27.480sft
		<b>Vert error</b>	0.095sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.110sft	<b>Quality</b>	Control quality

<b>Point</b>	R1015-8_GPS	<b>Northing</b>	412271.652sft	<b>Point</b>	R1015-8
<b>Latitude</b>	34°51'54.75365"N	<b>Easting</b>	2617188.178sft	<b>Northing</b>	412271.743sft
<b>Longitude</b>	76°56'32.20841"W	<b>Elevation</b>	26.009sft	<b>Easting</b>	2617188.196sft
<b>Height</b>	-98.102sft	<b>Horz error</b>	<b>0.093sft</b>	<b>Elevation</b>	26.257sft
		<b>Vert error</b>	<b>0.247sft</b>	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	<b>0.264sft</b>	<b>Quality</b>	Control quality
<b>Point</b>	R1015-2_GPS	<b>Northing</b>	402973.166sft	<b>Point</b>	R1015-2
<b>Latitude</b>	34°50'19.02640"N	<b>Easting</b>	2635346.797sft	<b>Northing</b>	402973.197sft
<b>Longitude</b>	76°52'56.72820"W	<b>Elevation</b>	30.564sft	<b>Easting</b>	2635346.790sft
<b>Height</b>	-93.549sft	<b>Horz error</b>	0.031sft	<b>Elevation</b>	30.551sft
		<b>Vert error</b>	0.013sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.033sft	<b>Quality</b>	Control quality
<b>Point</b>	R1015-1_GPS	<b>Northing</b>	402003.315sft	<b>Point</b>	R1015-1
<b>Latitude</b>	34°50'09.39347"N	<b>Easting</b>	2635547.518sft	<b>Northing</b>	402003.319sft
<b>Longitude</b>	76°52'54.56904"W	<b>Elevation</b>	29.062sft	<b>Easting</b>	2635547.555sft
<b>Height</b>	-95.062sft	<b>Horz error</b>	0.037sft	<b>Elevation</b>	29.065sft
		<b>Vert error</b>	0.003sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.037sft	<b>Quality</b>	Control quality
<b>Point</b>	R112_GPS	<b>Northing</b>	393265.487sft	<b>Point</b>	R112
<b>Latitude</b>	34°48'42.58794"N	<b>Easting</b>	2637439.008sft	<b>Northing</b>	393265.426sft
<b>Longitude</b>	76°52'34.12612"W	<b>Elevation</b>	31.433sft	<b>Easting</b>	2637438.985sft
<b>Height</b>	-92.760sft	<b>Horz error</b>	0.065sft	<b>Elevation</b>	31.361sft
		<b>Vert error</b>	0.072sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.097sft	<b>Quality</b>	Control quality